U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-260 935

Air Pollution Abstracts
Volume 2, Number 3
March 1971

Environmental Protection Agency, Research Triangle Park, N C

Mar 71

344067

PB 260 935

Volume 2, No. 3
March 1971

CODEN: APABC-71-03

AIR POLLUTION ABSTRACTS

ENVIRONMENTAL PROTECTION AGENCY
Air Pollution Control Office

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

TECHNICAL REPORT DATA

(Please read Instructions on the reverse before completing)

1. REPORT NO. APABCA- 2-3-1971	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Air Pollution Abstracts Volume 2 , No. 3		5. REPORT DATE March 1971
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS Air Pollution Technical Information Center Research Triangle Park, North Carolina 27711		10. PROGRAM ELEMENT NO.
		11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS Same		13. TYPE OF REPORT AND PERIOD COVERED
		14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

This periodical is published to inform air pollution personnel of the Environmental Protection Agency (EPA), and others, of technical literature recently accessioned by the Air Pollution Technical Information Center (APTIC). For each accession, its Abstract Number, APTIC accession number, bibliographic citation, and abstract are given. Translations are cited with their sources whenever possible. The subject fields are as follow: Emission Sources; Control Methods; Measurement Methods; Air Quality Measurements; Atmospheric Interactions; Basic Science and Technology; Effects-Human Health; Effects-Plants and Livestock; Effects-Materials; Economic Aspects; Standards and Criteria; Legal and Administrative; Social Aspects; and General and Miscellaneous. All abstracts are listed under one of the above subject fields. A subject and author index are included. This issue contains abstracts of more than 1200 documents.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air pollution Abstracts Information retrieval		13B 5B

18. DISTRIBUTION STATEMENT Unlimited	19. SECURITY CLASS *(This Report)*	21. NO. OF PAGES 280
	20. SECURITY CLASS *(This page)*	22. PRICE $9.25

EPA Form 2220-1 (9-73)

AIR POLLUTION ABSTRACTS

Vol. 2, No. 3 March 1971

CONTENTS

Introduction ii
Subject Fields and Scope Notes iii
Abstract Bulletin 1
Subject Index SU-1

The terms that most closely describe the information presented in the documents are arranged alphabetically. The title of the document is indented below the subject term. The APTIC accession number and the subject field where the abstract can be located follow on the next line.

Author Index PA-1

Personal authors (maximum of five per document) are arranged alphabetically. The names are presented last name first. No distinction is displayed between senior and other authors. The title of the document is indented below the author's name. The APTIC accession number and the subject field where the abstract can be located follow on the next line.

INTRODUCTION

This periodical is published to inform APCO personnel and others of technical literature recently accessioned by the Air Pollution Technical Information Center (APTIC). For each accession, the bibliographic citation, an abstract, and the APTIC accession number are given.

APCO staff should direct requests for full text duplicates (if not locally available) to APTIC, using the order form provided. Translations of foreign language documents will be arranged upon request for APCO personnel only.

For non-APCO readers, APTIC can provide copies of only those articles that have been written by APCO personnel and have not been published in the open literature. Requests for all other articles should be directed to local libraries, publishers, or authors, with the following exception. Copies of APCO technical publications in the AP or APTD series will be provided, while supplies permit, only to certain qualified requesters, e.g., APCO contractors, APCO grantees, and air pollution control agencies. When requesting any material from APTIC, please include the complete citation.

Citations of documents available for purchase from the National Technical Information Service, U. S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22151 are designated as CFSTI or NTIS. Most NTIS documents are sold for three dollars in paper copy and ninety-five cents in microfiche. Registered users of the Defense Documentation Center (DDC) may obtain microfiche documents in the "AD" series without charge from: Defense Documentation Center, Cameron Station, Alexandria, Virginia 22314. Citations of documents available for purchase from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., are designated as GPO.

As another service, abstracts of all literature in APTIC (not just in a single issue of this periodical) on any subject related to air pollution will be provided free of charge upon request. APTIC can search information more recent than that in the current issue of this periodical because of the lapse of time entailed by editorial, make-up, and printing work. More than 1400 subject index terms are available for such searching–several times those included in the subject index in each issue. An author index is also included in each issue.

SUBJECT FIELDS AND SCOPE NOTES

1. EMISSION SOURCES

Information pertaining to an industry, process, or material associated with air pollution. Documents in this category are concerned primarily with characteristics of a specific class of emission sources including types, rates, industries; secondary coverage may include effects, control methods, etc.

2. CONTROL METHODS

Includes equipment and both specific source control and general abatement efforts. Included are documents describing the operating principles, design, operation, efficiency, etc., of equipment and methods of removing pollutants. The scope of the document can vary from a device for a specific source to an approach applicable to an entire industry —e.g., automobiles.

3. MEASUREMENT METHODS

Includes equipment as well as methods. Confined to development, testing and evaluation of pollutant determination methods (sampling, analytical, monitoring) and equipment, as such. Data obtained by use of methods in specific applications are placed in the applicable subject categories.

4. AIR QUALITY MEASUREMENTS

Pollution measurements in the ambient air, generally related to specific geographical locations, such as area surveys. Also includes general reviews of area situations and emission source inventories.

5. ATMOSPHERIC INTERACTION

All chemical and physical phenomena occurring in the atmosphere. Included is material on dispersion, air pollution forecasts, meteorological effects, topographical effects, photochemical reactions in the atmosphere, etc. Laboratory studies of photochemical reactions are assigned to Basic Science and Technology.

6. BASIC SCIENCE AND TECHNOLOGY

General discussions or data compilations for the basic physical and chemical properties of pollutants. Theoretical and laboratory studies on related chemical and biological reactions and mechanisms. Mass transfer and other basic knowledge related to process engineering applications in emission control or abatement. Excludes photochemical studies in the atmosphere and biochemical studies related to effects of air pollution.

7. EFFECTS–HUMAN HEALTH

Covers medical and epidemiological studies; biological effects other than those on plants and livestock produced by air pollutants; laboratory animal experiments.

8. EFFECTS–PLANTS AND LIVESTOCK

Effects on vegetation–crops, trees, other plants–and on livestock as distinguished from laboratory experimental animals.

9. EFFECTS–MATERIALS

Deterioration, corrosion, etc., of physical materials, buildings, and structures.

10. ECONOMIC ASPECTS

Economic implications of air pollution and its control, e.g., economic losses from pollution damage, and costs of control programs or equipment in general.

11. STANDARDS AND CRITERIA

Recommended or adopted guides, criteria and standards for allowable emission limits or pollutant concentrations, air quality, equipment characteristics, and fuels.

12. LEGAL AND ADMINISTRATIVE

Legal aspects include legislation, ordinances, rules, litigation, hearings, decisions, etc. Administration covers administrative and miscellaneous information concerning control agencies and control and research programs. Typical topics are personnel, budgets, contractual activities and program descriptions.

13. SOCIAL ASPECTS

Sociological and psychological aspects such as social attitudes, public opinion studies, public relations, and public information.

14. GENERAL AND MISCELLANEOUS

Reviews of general problems, trends and background. Documents not assignable to other categories.

AIR POLLUTION ABSTRACTS

1. EMISSION SOURCES

REFERENCE BOOK SUMMARY OF NATIONWIDE EMISSIONS.
Preprint, 36p., 1969 (*).
Personal Author Not Recorded.
Identifiers: *Pollutants, *Sources, Area surveys, United states, Non-urban areas, Urban areas, Automotive emissions, Stack gases, Particulates, Coal, Natural gas, Fuel oils, Chemical processing, Food and feed operations, Kilns, Metal fabricating and finishing, Paper manufacturing, Petroleum production, Primary metallurgical processing, Solid waste disposal, Aircraft, Diesel engines, Spark ignition engines, Ships, Automobiles, Hydrocarbons, Carbon monoxide, Nitrogen oxides, Sulfur oxides.

Estimates for the year 1966-1967 of nationwide emissions of the five primary air pollutants, carbon monoxide, oxides of nitrogen, sulfur oxides, particulates, and hydrocarbons, are presented. Information is broken down by source category, urban and non-urban location, selected air quality control regions, and projected motor vehicle emissions. The accuracy of the estimates is varied due to incomplete information and inadequately defined emissions. Sources include motor vehicles, gasoline and diesel engines, aircraft, railroads, vessels, coal, fuel oil, natural gas, wood, solid waste disposal, primary and secondary metal industry, cement manufacture, oil refineries, chemical processing, paper manufacture, and feed milling. A summary of the methodology used to arrive at the estimated figures is presented.
APTIC-12496

REPORT FOR CONSULTATION ON THE METROPOLITAN PROVIDENCE INTERSTATE AIR QUALITY CONTROL REGION (RHODE ISLAND-MASSACHUSETTS).
For primary bibliographic entry see Field 12.
APTIC-12569

DISTRIBUTION OF FUNGAL SPORE TYPES IN SELECTED AREAS IN TEXAS.
Preprint, Houston Univ., Tex., Dept. of Biology, 8p., 1968 (*). 12 refs.
J. D. Weete, and D. J. Weber.
Identifiers: *Texas, *Fungi, *Spores, *Dispersion.

The movement of fungal spores, particularly pathogens, has many implications. To plant pathologists, the movement of fungal spores represents the possible introduction of new pathogens or new strains of existing pathogens and an inoculum source for a potential disease development. To medical personnel, it is a source for respiratory allergens. To food microbiologists, the fungal spore movement is a source of inoculum for the deterioration of stored materials and foods. Most studies on spore dispersion in the United States have concentrated on a particular crop in relation to a specific pathogen. Fungal spores are also of interest from the point of view of air pollution. The fungal spore population was sampled in selected areas in Texas. The predominate spore type varied with the environment. However the two most predominate spore types were the Penicillium-Aspergillus type and the Cladosporium type. Many other spore types were detected in lower numbers. (Author abstract modified)
APTIC-12613

SYSTEMS STUDY OF NITROGEN OXIDE CONTROL METHODS FOR STATIONARY SOURCES.
For primary bibliographic entry see Field 02.
APTIC-12619

SYSTEMS STUDY FOR CONTROL OF EMISSIONS. PRIMARY NONFERROUS SMELTING INDUSTRY. (FINAL REPORT). VOLUME II: APPENDICES A AND B.
For primary bibliographic entry see Field 02.
APTIC-12751

DISCUSSION OF 'A STATISTICAL APPROACH TO DESCRIBING VEHICULAR DRIVING CYCLES'. F. BECKLEY SMITH, JR., W. A. P. MEYER, AND R. U. AYRES, SAE PAPER NO. 690212.
For primary bibliographic entry see Field 06.
APTIC-12771

SYSTEMS STUDY FOR CONTROL OF EMISSIONS. PRIMARY NONFERROUS SMELTING INDUSTRY. (FINAL REPORT). VOLUME III: APPENDICES C THROUGH G.
For primary bibliographic entry see Field 02.
APTIC-12777

SYSTEMS STUDY FOR CONTROL OF EMISSIONS. PRIMARY NONFERROUS SMELTING INDUSTRY. (FINAL REPORT). VOL I.
For primary bibliographic entry see Field 02.
APTIC-12823

AIR POLLUTION IN CALVERT COUNTY, MARYLAND.
Maryland State Dept. of Health, Baltimore, Div. of Air Quality Control. 22p., Aug. 1969. 14 refs.
H. L. Alkire.
Identifiers: *Area surveys, *Calvert county, County governments, Maryland, Non-urban areas, Odors, Fuels, Kraft pulping, Nuclear power plants, Steam plants, Dumps, Transportation, Dust fall, Meteorology, Topographic interactions.

A survey of air pollution in Calvert County, Maryland is presented. The topography and meteorology of the area are described, and the aspects of land use, transportation, population, and fuel use are discussed. The only industry in this County which causes air pollution is associated with lumbering or the processing of wood products. The types of pollutants which are created are those which can be reasonably controlled. The amount of urban-type pollution is very small due to a relatively low population density and the lack of large urban areas. A nuclear power generating station under construction caused mixed public reaction. Unsatisfactory levels of dustfall and sulfation exist in the vicinity of a large electricity generating plant. The three county dumps often burn and cause unpleasant odors. The area has relatively good atmospheric ventilation which tends to disperse any pollutants emitted into the atmosphere. Recommendations for control and abatement procedures are given.
APTIC-12832

AIR POLLUTION IN ST. MARY'S COUNTY, MARYLAND.
Maryland State Dept. of Health, Baltimore, Div. of Air Quality Control, 18p., Aug. 1969. 15 refs.
H. L. Alkire.
Identifiers: *Area surveys, *St. mary's county, County governments, Maryland, Non-urban areas, Fuels, Food and feed operations, Petroleum production, Open burning, Dumps, Transportation, Meteorology, Topographic interactions.

A survey of the air pollution in St. Mary's County, Md., is presented. The topography and meteorology of the County are described, and the aspects of land use, population, transporation, and fuel use are discussed. Although industry in this County is less than in any other Maryland County, there are still some industrial polluters. Several small seafood processing and lumbering industries cause pollution of concern to a few people in scattered areas. The proposed construction of a petroleum refinery in the area poses a potential threat in the near future. Fires occasionally break out in the dumps in the county. The open burning of refuse by individual home owners is fairly common. The amount of urban-related pollution is very small due to the lack of large urban complexes. Recommendations for control and abatement procedures are presented.
APTIC-12833

AIR POLLUTION IN WORCESTER COUNTY MARYLAND.
Maryland State Dept. of Health, Baltimore, Div. of Air Quality Control, 24p., July 1969. 19 refs.
H. L. Alkire.
Identifiers: *Area surveys, *Worcester county, County governments, Maryland, Non-urban areas, Odors, Fuels, Kraft pulping, Fertilizer manufacturing, Food and feed operations, Dumps, Transportation, Meteorology, Topographic interactions.

A survey of the air pollution in Worcester County, Md., is presented. The topography and meteorology of the county are described, and the aspects of land use, population, transportation, and fuel usage are discussed. Specific air pollution problems are associated with poultry raising and processing, grain milling operations, fertilizer blending, mink farms, open dumps, and a plywood factory. The major pollutant from these sources is odor. Projected statistics indicate that the area will not have large urban types of pollution in the near future. Recommendations for control and abatement procedures are presented.
APTIC-12834

THE THREAT POSED BY DUST AND INDUSTRIAL GASES EMITTED BY CENTRAL HEATING PLANTS AND OTHER AIR POLLUTION SOURCES.
For primary bibliographic entry see Field 07.
APTIC-22246

OZONE. A HANDBOOK OF PHYSICAL AND TECHNICAL DATA.
Ozone Research and Equipment Corp., Phoenix, Ariz., 8p., 1961 (*).
Dale J. Milnes.
Identifiers: *Ozone, Toxicity, Iodimetric methods, Measurement methods, Oxygen, Photochemical reactions.

The following aspects of ozone are briefly discussed: atmospheric ozone, ozone applications, environmental ozone, ozone generators (quartz mercury arc ultra-violet, silent arc discharge, and electrolytic), ozone measurement, molecular structure, solubility, and toxicity. The section on measurement includes a detailed review of the various units of measurement in which ozone concentrations are reported, and of the principles underlying the processes for conversions among these units. A table is given of the physical constants of ozone and oxygen.
APTIC-22731

REACTIONS OF METAL NITRATES IN MOLTEN SULFUR.
South Carolina Univ., Columbia, Dept. of Chemical Engineering, Thesis (Ph.D.), Ann Arbor, Mich., Univ. Microfilms, Inc., 1966, 165p. 65 refs.
Samuel Lee Torrence.
Identifiers: *Nitrates, *Sulfur compounds, *Nitration, Reactors (nuclear), Sulfuric acid, Aluminum compounds, Iron compounds, Nickel compounds, Strontium compounds, Nitrogen, Nitric oxide (no), Nitrous oxide (n2o), Radioactive radiation, Reaction mechanisms.

The disposal of radioactive waste products in the form of metal nitrates may be accomplished by reacting them with molten sulfur. In this process, de-nitration and dehydration occur, producing compounds of greater stability than the original one. The reactions of aluminum, iron, nickel, and strontium nitrates with molten sulfur are studied for the purpose of determining the reaction products. Nitric oxide, nitrous oxide, and nitrogen are gaseous products. No sulfur gases are found in the gas phase when water vapor is present. The combined sulfur is distributed between sulfuric acid on the walls and a solid sulfate within the molten sulfur. Analytical procedures, involving mass spectroscopy, wet chemical analyses, and equilibrium calculations are developed to describe the material balances and product distribution. (Author abstract modified)

APTIC-22814

COAL AND CLEAN AIR.

Preprint, Society of Automotive Engineers, Inc., New York, 7p., 1970. (Presented at the Society of Automotive Engineers, Inc., New York, (Presented at the Society of Automotive Engineers, Earthmoving Industry Conference, Peoria, Ill., April 14-15, 1970, Paper 700552.)
George W. Land.
Identifiers: *Combustion products, *Fuels, *Coal, Smog, Natural gas, Fuel oils, Steam plants, Statistical analyses, Hydrocarbons, Nitrogen oxides, Sulfur oxides.

Data on fossil fuel energy (coal, petroleum, natural gas) consumed in the U. S. since 1920 are presented to show that the increase in air pollution in recent years is not from coal, which has remained relatively constant on the average in quantities used. Evidence is also presented showing that less than 20% of the pollutants emitted into the air in a typical year arises from generation of electricity and space heating, the principal uses for coal. The combustion of coal produces solid and gaseous pollutants; almost complete control of particulates is technically and economically feasible, while control of gases, mainly oxides of sulfur and nitrogen, is much less advanced. Thus, low-sulfur fuels must be used; however, because of the shortage of low-sulfur coal in some areas (mainly the Midwest), gas or low sulfur oils are substituted. Increases in gaseous pollutants in the last 50 years are attributed to increased use of natural gas and petroleum, and it is concluded that the nitrogen oxides and hydrocarbons together deserve much more control effort and research funds than they have received in comparison to sulfur dioxide, especially in view of their role in smog formation.
APTIC-23726

AIR POLLUTION PROBLEMS IN THE UNITED STATES.

World Health Organization, Copenhagen (Denmark), Regional Office for Europe, Proc. Conf. Public Health Aspects Air Pollution Europe, Milan, Italy, 1957, p. 21-36. 11 refs. (Nov. 6-14.)
Philip Drinker.
Identifiers: *Industrial emission sources, Combustion products, Stack gases, Particulates, Smog, Fuels, Steam plants, Primary metallurgical processing, Stacks, Vehicles, Dispersion, Fluorine compounds, Nitrogen oxides, Sulfur dioxide, Ozone.

As in other countries, the demand for power in the U. S. is increasing steadily, at an estimated 3% annually. Bituminous coal is still the most used fuel, followed in order by oil and gas. Some of the coals used in the mid- and far-west have a sulfur content as high as 5%; thus some very large power stations emit sulfur dioxide in amounts comparable to those from smelters roasting sulfide ores. There is a general rule in the U. S. requiring power stations that burn coal in powdered form to clean their stack effluents of grit and ash before discharge. It is also common practice to make an extensive meteorological survey before building a tall chimney, to insure an adequate height for dispersion of smoke plumes. Pollution from ore smelters, by fluorides, and from vehicle exhausts, with emphasis on smog effects, is discussed. Attention has not been paid to date to nitrogen oxides in chimney gases; these concentrations increase with furnace temperatures, so that the better the plant is run the more oxides of nitorgen are given off. Although the technology for control of the more well known pollutants has made considerable progress, no practical method has yet been devised for control of nitrogen oxides.
APTIC-24039

TOXICOLOGIC ASPECTS OF FLAMMABILITY AND COMBUSTION OF POLYMERIC MATERIALS.

For primary bibliographic entry see Field 07.
APTIC-24153

A COMPARISON OF NAPCA AND IIA SOURCE SAMPLING METHODS.

For primary bibliographic entry see Field 03.
APTIC-24582

LOADING FACILITIES.

In: Emissions to the Atmosphere from Eight Miscellaneous Sources in Oil Refineries. Los Angeles County Air Pollution Control District, Calif., California Dept. of Public Health, Berkeley, Bureau of Air Sanitation, Public Health Service, Washington, D. C., Community Air Pollution Program, and Western Oil and Gas Assoc., Los Angeles, Calif., Air Pollution Control Committee, Rept. 8, Section 3, p. 19-24, 50-51, June 1958. 9 refs.
F. Bonamassa.
Identifiers: *Loading facilities, *Petroleum refining, *Vapor recovery systems, Los angeles, Fuel gases, Gasolines, Trains, Trucks, Hydrocarbons, Compressed gases.

Calculations were made to determine hydrocarbon vapor emissions to the atmosphere from final product filling of vessels (railroad tank cars, tank trucks and trailers, or drums) at refineries in Los Angeles County; emissions from loading at bulk stations or marine terminals located outside the refineries are not included. Questionnaires were completed by the refineries on the average daily amounts of products shipped, divided into four categories by Reid vapor pressure. Vapor recovery systems on loading facilities are in widespread use; all of the liquefied petroleum gas, almost all the motor and aviation gasolines, and about 30% of the other distillates (vapor pressure 1-4 lbs) are loaded under vapor recovery. The total emissions of hydrocarbons from loading operations in county refineries amounted to 1800 lbs/day. If vapor recovery were not used, an additional 22,700 lbs/day would be emitted.
APTIC-24601

TURNAROUNDS, EQUIPMENT MAINTENANCE, AND BLOWDOWN SYSTEMS.

In: Emissions to the Atmosphere from Eight Miscellaneous Sources in Oil Refineries. Los Angeles County Air Pollution Control District, Calif., California Dept. of Public Health, Berkeley, Bureau of Air Sanitation, Public Health Service, Washington, D. C., Community Air Pollution Program, and Western Oil and Gas Assoc., Los Angeles, Calif., Air Pollution Control Committee, Rept. 8, Section 4, p. 25-31, 50-51, June 1958. 9 refs.
R. K. Palmer, and B. J. Steigerwald.
Identifiers: *Petroleum refining, *Maintenance, *Hydrocarbons, Annual, Diurnal, Los angeles, Vapors.

Estimates were made of hydrocarbon emissions from start-up and shut-down refinery unit procedures ('turnaround') and equipment and storage tank maintenance at oil refineries in Los Angeles County. Calculations were made on the basis of field surveys and a questionnaire to the refineries. The maximum atmospheric emissions from turnarounds are calculated as 254 tons per year, an average of 0.7 ton per day; however, since 60% of all shutdowns occur on Sunday and Monday, the weekend (Sun. and Mon.) emissions are 152 tons per year, or an average of 3 tons per weekend. Maximum emissions from tank cleaning average 1.3 tons per day of hydrocarbon vapors, with tank cleaning operations spread more or less uniformly throughout the week.
APTIC-24602

THE EXCESS FUEL CONSUMED BY CARS WHEN STARTING FROM COLD.

Ministry of Transport, Great Britain, Road Research Lab., RRL Rept. LR 315, 18p., 1970. 4 refs. NTIS: PB 192146
P. F. Everall, and J. Northrop.
Identifiers: *Engine operating cycles, *Gasolines, *Vehicles, Great britain, Automobiles, Buses, Temperature (atmospheric), Fluid flow, Heat transfer.

The extra amount of fuel used when a car is started from cold was determined. Two vehicles were used in the experiment, a 1967 Rover 2000 saloon car and a 1965 Ford minibus, which were driven round the small loop of the Road Research Laboratory tract. The flow of fuel between the tank and the carburetor was determined in units of 0.0005 gallon on an electromagnetic digital counter, placed inside the vehicle. A measurement of air temperature was taken from a thermometer mounted close to the track. During the warming-up period averaged over the year, 10-15% of the total fuel used was extra to that which would have been needed if the engine was already warm. The distance equivalent to the excess fuel was positively correlated with speed and negatively correlated with air temperature. In most of the cases tested, the equivalent distance was about 1-3 kilometers, though examples of 6 kilometers did occur at freezing temperatures. The time taken for the fuel consumption of both vehicles to settle down was of the order of 25 minutes on the average. Averaged over all trips, the formulae measured when the engine was fully warm underestimated the amount of fuel used by about 10%. (Author conclusions modified)
APTIC-24605

CARCINOGENIC HYDROCARBONS AND RELATED COMPOUNDS IN PROCESSED RUBBER.

Cancer Res., 11 (5):318-324, May 1951. 17 refs.
Hans L. Falk, Paul E. Steiner, Sam Goldfein, Alexander Breslow, and Ruth Hykes.
Identifiers: *Carcinogens, *Rubber, *Polynuclear compounds, Mice, Cancer, Chrysenes, Perylenes, Phenanthrenes, Benzpyrenes.

During the construction of a chemical apparatus in which ground glass connections could not be used because of the large size of the flasks, benzene extracts of rubber stoppers previously washed with ether and methanol still contained blue-green fluorescing substances. These extracts had the ultraviolet absorption spectra of carcinogenic hydrocarbons and other compounds of interest. This discovery seemed of such great possible importance to investigators in cancer research, to the rubber industry, and to public health that further experiments were made. A benzene extract of rubber stoppers was carcinogenic by skin painting in mice. From such extracts of rubber stoppers and of an automobile tire, eight aromatic hydrocarbons were isolated. 3,4-Benzpyrene, pyrene, chrysene, and alkyl cyclopentenophenanthrene were identified beyond reasonable doubt by their ultraviolet absorption spectra, and, additionally, in the case of pyrene and chrysene by melting point determinations. The identity of another crystalline product, 1,12-benzperylene, seems fairly certain. The oily nature of three products, 1,2-benzpyrene, alkyl pyrene, and alkyl 1,2-benzanthracene made definite identification impossible. 3,4-Benzpyrene, 1,2-benzpyrene, pyrene, and chrysene are described as carcinogenic in the literature. The other four compounds are structurally related to carcinogenic compounds. The possible importance of these observations to workers in the industries concerned, to the general public, and to cancer research is discussed. (Author summary modified)
APTIC-24629

DETAILED DETERMINATION OF NITROGEN COMPOUNDS CONTAINED IN WASTE GASES.

For primary bibliographic entry see Field 03.
APTIC-24682

AN INVENTORY OF AUTOMOBILE GASES.

SAE (Soc. Automotive Engrs.) Trans., vol. 63:581-585, 1955. 14 refs. (Presented at the Society of Automotive Engineers Golden Anniversary Annual Meeting, Detroit, Mich., Jan. 10, 1955.)
Dale H. Hutchison, and Francis R. Holden.
Identifiers: *Hydrocarbons, *Engine exhausts, Emission standards, Smog, Automobiles, Air quality measurements.

Mass spectrometric analysis of exhaust samples from passenger cars determined that 700 tons a day represents the minimum daily emission of hydrocarbons to the Los Angeles atmosphere from this source. A return to the relatively smog-free conditions that existed prior to 1945 will require a reduction in hydrocarbon emissions of about 60%, and more if the number of cars continues to increase. In no case should the total hydrocarbon emission exceed about 600 tons a day. It is believed that devices can be built that will convert 60% of the unburned or partially burned hydrocarbons to inert gaseous products.
APTIC-24700

EFFECT OF TETRAETHYLLEAD ON PREFLAME REACTIONS IN AN ENGINE.

Ind. Eng. Chem., 27 (8):872-879, Aug. 1935. 11 refs.
Lloyd Withrow, and Gerald M. Rassweiler.
Identifiers: *Spark ignition engines, *Ultraviolet spectrometry, *Tetraethyl lead, Gasolines, Fuel additives, Oxides.

Ultraviolet absorption spectra of the gaseous charge in an engine indicate that when tetraethyl lead is added to the fuel to prevent knock, there is an effect on the preflame reactions in that portion of the charge which, in the absence of tetraethyl lead, suddenly inflames at the time of knock. Atomic lead has been identified in the noninflamed charge in the knocking zone at the moment that antiknock action is being effected, but no accompanying absorption by lead monoxide has been observed. When lead is vaporized in a hot nichrome tube, the absorption spectra exhibit lead monoxide bands at lower temperatures than atomic lead lines. Comparison of experiments in and out of the engine indicate that lead monoxide is being reduced in the noninflamed charge. (Author abstract)
APTIC-24718

BLIND CHANGING.

In: Emissions to the Atmosphere from Eight Miscellaneous Sources in Oil Refineries. Los Angeles County Air Pollution Control District, Calif., Calif. Dept. of Public Health, Berkeley, Bureau of Air Sanitation, Public Health Service, Washington, D. C., Community Air Pollution Program, and Western Oil and Gas Association, Los Angeles, Calif., Air Pollution Control Committee, Rept. 8, Section 2, p. 14-18, 50-51, June 1958. 9 refs. (Joint District, Federal and State Project for the Evaluation of Refinery Emissions.)
R. K. Palmer.
Identifiers: *Blind changing, *Petroleum refining, *Hydrocarbons, Los angeles.

Blind changing, or the closing off of unused feeder lines in single refinery pipes that carry several different products, results in spillage of hydrocarbons. A questionnaire was prepared sent to the 13 Los Angeles refineries that change blinds requesting that they keep an accurate 2-month record on all changes on lines carrying products with volatilities as high or higher than kerosine, along with sufficient data to permit a reasonably accurate evaluation of hydrocarbon emissions to the atmosphere. The resulting data are presented. Assuming an average specific gravity of 0.75, the emission to the atmosphere of 2000 gallons of hydrocarbons for a 61-day period indicates emissions of 200 lbs/day.
APTIC-24721

AIR BLOWING.

In: Emissions to the Atmosphere from Eight Miscellaneous Sources in Oil Refineries. Los Angeles County Air Pollution Control District, Calif., California State Dept. of Public Health, Berkeley, Bureau of Air Sanitation, Public Health Service, Washington, D. C., Community Air Pollution Program, and Western Oil and Gas Association, Los Angeles, Calif., Air Pollution Control Committee, Rept. 8, Section 1, p. 6-13, 50-51, June 1958. 9 refs. (Joint District, Federal and State Project for the Evaluation of Refinery Emissions.)
V. H. Sussman.
Identifiers: *Air blowing, *Petroleum refining, *Air quality measurements, *Hexanes, Los angeles, Aerosols, Chemical composition, Spectrophotometry, Sampling methods.

Atmospheric emissions from air blowing, a minor operation in which air is blown through petroleum fractions for removal of turbidity due to moisture and for agitation during treating, were measured in the three Los Angeles County refineries which employ the process. The effluent from the operation contains hydrocarbon vapors and aerosols. The total emissions from air blowing in the County are relatively small compared to the total of all hydrocarbon emissions from refinery operations. The units tested, location of sampling points, sampling and analytical methods, and calculations are described. The concentration of hydrocarbons in the mine sampling tube as determined by an infrared spectrophotometer 10-30 ppm (as hexane) for all units tested. Total emission rate was 35 lbs/day for five of the seven units tested; the rate for the sixth was 2 lb/day, and for the seventh, scheduled for discontinuation, was 905 lb/day.
APTIC-24723

MOTOR EXHAUST COMPOSITION IN RELATION TO SELECTED FUELS.

Air Pollution Control Assoc., Los Angeles, West Coast Section, Proc. Air Pollution Control Assoc., West Coast Sect., 1st Tech. Meet., Los Angeles, Calif., 1957, p. 13-28. 7 refs. (March 25-26.)
Paul P. Mader, and Leslie A. Chambers.
Identifiers: *Engine exhausts, *Gasolines, *Chemical composition, Eye irritation, Engine operating cycles, Carbonyls, Olefins, Aromatic hydrocarbons, Ozone, Vapors.

Automobile exhaust vapors were analyzed for alpha, internally double bonded, and alpha olefins with branched chain on the beta carbon. The analyses were carried out for four cycles of engine operation with three different kinds of fuels. The smallest amounts of reactive olefins were produced with catalytically reformed gasoline (A). Higher olefin values were produced by a fuel (B) comprising 45% thermally cracked stock, 45% naphtha, and 10% casing head; but the greatest concentration of smog-producing olefins were formed with a premium-grade fuel (C) containing 23.5% aromatics and 32.5% olefins. Since the change of gasoline was consistently accompanied by a corresponding change in the olefin concentration, it is concluded that a correlation exists between the type of gasoline used to operate the engine and the composition of its exhaust vapors. Exhaust vapors were also compared with regard to their capacity to form oxidation products upon irradiation. Exhaust vapors produced with fuel C were approximately three to five times more reactive in the formation of carbonyl compounds, ozone, and eye irritation than exhaust vapors produced by fuel A. (Author summary modified)
APTIC-24729

POLLUTION FROM COMBUSTION OF FOSSIL FUELS.

In: Air Pollution-1970, Part I. 91st Congress (Senate), Second Session on S.3229, S.3466, S.3546, p. 172-181, 1970. 3 refs. (Hearings before the Subcommittee on Air and Water Pollution of the Committee on Public Works, March 16, 17, 18, 1970.)
Paul W. Spaite, and Robert P. Hangebrauck.
Identifiers: *Fuels, *Electric power production, *Combustion, Senate hearings, Fly ash, Boilers, Domestic heating, Operating variables, Nitrogen oxides, Sulfur oxides.

Currently, emissions of fly ash, sulfur oxides, and nitrogen oxides by fossil fuel burning sources come to about 45 million tons per year in the United States, and consumption of fossil fuels is doubling every 25 years. These emissions originate in power plants, industrial boilers, and smaller installations used for commercial and residential heating. Power production, which accounts for [illegible]0% of the present total sulfur oxide emissions from combustion and over 90% of the total anticipated in 30 years, is by far the most important source judged on the basis of total contribution from all combustion sources. Even when consideration of the nature of the control problem is limited to coal burning power plants, the problem of non-uniformity in the processes which must be controlled still is apparent. Factors such as plant size, plant age, and a host of considerations associated with location make each power plant a unique control problem. Oxides of nitrogen range from an estimated 9 million tons at present to about 25 million tons by the year 2000. Presently available equipment for fly-ash control does not efficiently collect particles less than approximately 1.0 micron in diameter. Fine particulates tend to remain in suspension in the upper atmosphere, where continued build-up of such materials could produce unacceptable worldwide climate changes. From the control point of view, combustion sources can be divided into three classes with distinctly different characteristics as far as the nature of the control problem is concerned: boilers under 500 million Btu/hr capacity, existing boilers larger than 70 mw, and large new boilers that will be built in the future and for the most part will be 500-1000 mw in size.
APTIC-24732

ABATEMENT OF AIR POLLUTION IN THE CHEMICAL INDUSTRY.

Chem. ind. (London), vol. 41:1266-1270, Oct. 8, 1955. 11 refs. (Presented at the London Section of the Society of Chemical Industry Symposium on the Prevention of Atmospheric and Water Pollution in the Chemical Industry, London (England). (April 4-5, 1955.)
W. A. Damon.
Identifiers: *Abatement, *Chemical processing, *Combustion, Legislation, Great britain, Fuels, Primary metallurgical processing, Control methods, Odor counteraction, Aluminum compounds, Sulfur oxides, Electrolysis.

The special problems of air pollution arising from chemical processes are largely dealt with under the provisions of the Alkali, etc. Works Registration Act, 1906, and the Alkali, etc., Works Regulation (Scotland) Act, 1951, as extended by subsequent legislation. Those processes that are considered to be the greatest potential contributors to air pollution are defined and not permitted to operate in the absence of control equipment for noxious or offensive gases. In connection with certain processes, e.g., sulfur acid manufacture, statutory limits of acidity are laid down; but, in general, reliance is placed on the use of the best practicable means. Suitable methods of treatment are given for noxious constituents of chemical reagents, odorous permanent gases from petroleum refining processes, sulfur oxides from fuel combustion, and waste gases from metallurgical processes, including electrolysis of alumina. It is emphasized that the control of these sources often requires changes in the processes themselves.
APTIC-24743

MEASURING GASEOUS EMISSIONS FROM AN AIRCRAFT TURBINE ENGINE.

For primary bibliographic entry see Field 03.
APTIC-24745

METAL HYDRIDES AS A SOURCE OF FUEL FOR VEHICULAR PROPULSION.

For primary bibliographic entry see Field 02.
APTIC-24746

THE REACTION OF ETHANE IN SPARK IGNITION ENGINE EXHAUST GAS.

Preprint, Society of Automotive Engineers, Inc., New York, 10p., 1970. 19 refs. (Presented at the

Society of Automotive Engineers, Mid-Year Meeting, Detroit, Mich., May 18-22, 1970, Paper 700471.)
S. C. Sorenson, P. S. Myers, and O. A. Uyehara.
Identifiers: *Ethane, *Engine exhausts, *Spark ignition engines, *Chemical reactions, Formaldehydes, Hydrocarbons, Methanes, Acetylenes, Ethylene, Propanes, Carbon monoxide, Reaction kinetics.

The reaction of ethane in spark ignition engine exhaust gas was studied between 1250-1335 F, 1.1-3.7% O_2, and 650-2600 ppm ethane, using the principle of the plug flow reactor. The main products were ethylene and carbon monoxide. Formaldehyde was an intermediate product in the reaction, while minor amounts of methane, acetylene, and propane were also found. The yields of ethylene and CO per mole of ethane reacted were independent of experimental conditions; yields of formaldehyde and methane were dependent on oxygen concentration, while the acetylene yield was not. The experimental results can be empirically correlated using an Arrhenius reaction model to describe the disappearance of ethane. The reaction products can then be determined from empirical correlations on the basis of the fraction of ethane reacted. The overall molecular process by which the ethane reacted was C_2H_6 yields C_2H_4 yields CH_2O yields CO, which is in qualitative agreement with the results from ethane-air and ethane-oxygen systems. There is some evidence to indicate that the major product distribution of a number of fuels is independent of temperature and concentrations. Additional studies are needed to prove or disprove this point. Depending on the extent of reaction, the products of incomplete oxidation of a saturated hydrocarbon in an exhaust system may be more objectionable from an emissions viewpoint than the initial fuel. (Author conclusions modified)
APTIC-24747

THE DISAPPEARANCE OF ETHYLENE, PROPYLENE, N-BUTANE, AND 1-BUTANE IN SPARK-IGNITION ENGINE EXHAUST.

Preprint, Society of Automotive Engineers, Inc., New York, 11p., 1970. 16 refs. (Presented at the Society of Automotive Engineers, Mid-Year Meeting, Detroit, Mich., May 18-22, 1970, Paper 700472.)
H. W. Sigworth Jr., P. S. Myers, and O. A. Uyehara.
Identifiers: *Engine exhausts, *Spark ignition engines, *Hydrocarbons, *Chemical reactions, Smog, Gas chromatography, Flame ionization detector, Simulation, Infrared spectrometry, Butanes, Butenes, Ethylene, Carbon monoxide, Oxygen, Photochemical reactions, Reaction kinetics, Temperature.

Ethylene, propylene, n-butane, and 1-butene, which make up a large portion of the photochemically reactive hydrocarbons in automobile exhaust, were reacted individually and as a mixture in a turbulent flow, heated reaction tube made of mild steel to study their disappearance during reaction and the appearance of intermediate hydrocarbon reaction products under conditions that roughly simulated those in an automobile engine exhaust port and manifold. The Arrhenius equation can be used to give a good prediction of the total hydrocarbon disappearance, after injection into essentially hydrocarbon free exhaust gas, of propylene, n-butane, or 1-butene, or of a mixture of these three hydrocarbons and ethylene. Techniques for using hydrocarbon composition and carbon monoxide data to predict exhaust photochemical reactivity and CO concentration from total hydrocarbon disappearance correlations are suggested. Total hydrocarbon reaction was generally strongly dependent on temperature and on oxygen concentration between 1% and 5%, and was less dependent on initial hydrocarbon concentration. Gas chromatograph data showed that during certain individual hydrocarbon reactions, the formation of other photochemically reactive hydrocarbons could increase smog-forming potential, despite a decreasing total hydrocarbon concentration. An estimate of total hydrocarbon concentration at a given extent of reaction in a mixture can be obtained by summing the predicted total hydrocarbon concentrations for reactions of the initial individual hydrocarbons in the mixture. (Author conclusions modified)
APTIC-24748

RESULTS OF THERMAL AND OF CATALYTIC PROCESSES TO LIMIT OLFACTORY EMISSIONS OF ORGANIC CHEMICAL COMPOUNDS.

For primary bibliographic entry see Field 02.
APTIC-24754

RESEARCH FINDINGS IN STANDARDS OF INCINERATOR DESIGN.

For primary bibliographic entry see Field 02.
APTIC-24767

PRINCIPAL AGENTS OF POLLUTION AND THEIR RATE OF DISPERSAL.

For primary bibliographic entry see Field 04.
APTIC-24776

SMOG CONTROL HELPS BAG MORE PROFITS.

For primary bibliographic entry see Field 02.
APTIC-24782

THE SHARE OF AUTOMOBILE EXHAUST GASES IN AIR POLLUTION.

(Zum Anteil der Autoabgase an der Luftverunreinigung). Text in German. Med. Klin. (Munich), 63 (63):1088-1089, July-Sept. 1968. 17 refs.
H. Wiethaup.
Identifiers: *Maximum allowable concentration, *Urban areas, *Engine exhausts, *Automobiles, Regulations, Rubber, Germany, Dusts, Automotive emission control, Snow, Hydrocarbons, Chromium oxides.

In addition to other pollutants generated by automobiles also 7000 tons of rubber are emitted into the atmosphere of Munich per year. The share of automobile traffic in air pollution became manifest following a snowfall in Stuttgart. The amount of dust in the atmosphere was reduced to less than 50%. The share of automobile exhaust gases, of tire and of street surface abrasion contributes substantially to the overall pollutant concentration level in urban areas and maximally permitted carbon monoxide pollutant levels are frequently exceeded. Traffic safety is thus impaired by reduced driver concentration and coordination and by the effect of pollution on pedestrians especially at peak traffic hours. New supplemental West German traffic regulations designed to reduce these hazards stress the desirability of uninterrupted flow of traffice in lieu of traffic interrupted by stop lights which generates a higher level of pollution, reduction of the maximal permissible levels of CO and of hydrocarbons in new cars and reduction of CO emission in old and new cars during idling by controlled carburetor adjustment.
APTIC-24783

TURBINE-POWERED BUSES. HOW GAS TURBINES WORK.

For primary bibliographic entry see Field 02.
APTIC-24811

EMISSION AND PERFORMANCE OF GASOLINE ENGINE.

(Gasorin kikan no seino to haiki joka gijutsu). Text in Japanese. Nenryo Kyokaishi (J. Fuel Soc. Japan, Tokyo), 49 (521):646-655, Sept. 20, 1970. 14 refs.
Shigeru Yanagihara.
Identifiers: *Automotive emissions, *Internal combustion engines, *Automotive emission control, Japan, Particulates, Gasolines, Catalytic afterburners, Flame afterburners, Fuel additives, Hydrocarbons, Lead compounds, Carbon monoxide, Nitric oxide (no), Chemical reactions.

Most automobile emissions are products of a high temperature and high pressure combustion chamber. The formation of carbon monoxide and nitric oxide are explained by equilibrium in the combustion reaction; the quench zone in the combustion chamber yield unburned hydrocarbons. Carbon monoxide and hydrocarbons can be oxidized in the expansion stroke or exhaust systems. Reduction of nitric oxide and particulate emission is a serious problem for exhaust control techniques. Although an exhaust thermal reactor and catalytic converter have been developed, nonleaded fuel is necessary for their effective operation. A low emission vehicle should appear by 1975, but the power plant of the family car still may be the gasoline engine. In the near future, fuel will be subject to more severe restrictions to reduce the pollutants in exhaust gas; as an immediate target, at the risk of reducing some of gasoline's performance, it would be made in such a way that emission of pollutants would be about 10% of the former level. In 5 or 10 years, automobiles should hardly be a problem as sources of environmental pollution.
APTIC-24813

FORMATION AND THEIR PREVENTION OF ACID SMUTS AT OIL FIRED BOILER.

For primary bibliographic entry see Field 02.
APTIC-24817

DEVELOPMENT OF HIGH SPEED BURNER.

For primary bibliographic entry see Field 02.
APTIC-24824

PROBLEMS SET BY ATMOSPHERIC POLLUTION IN JAPAN.

(Problemes poses par la pollution atmospherique au Japon). Text in French. Pollut. Atmos. (Paris), no. 47:163-168, July-Sept. 1970.
Personal Author Not Recorded.
Identifiers: *Electric power production, *Sulfur oxides control, Research programs, Planning and zoning, Emission standards, Japan, Stack gases, Stacks, Collectors, Desulfurization of fuels, So2 removal (combustion products), Meteorology, Topographic interactions, Sulfur dioxide.

A discussion of problems concerning atmospheric pollution due to the electric industry is presented. The meteorological and geographical conditions which condition the action of atmospheric pollution in Japan are mentioned; the legal limits for sulfur dioxide are indicated, and the formulae for determining these limits are described. Action taken by power plants to prevent pollution includes research of appropriate sites for setting up plants; reduction of the sulfur content in fuels; adoption of high smoke stacks; dust collectors; and emergency measures to be applied in the event of unfavorable meteorological conditions. An outline of the present state of research and techniques concerning the fight against SO_2 emissions is included.
APTIC-24826

LEADED OR NON-LEADED GASOLINE...WHAT ARE THE FACTS?

For primary bibliographic entry see Field 02.
APTIC-24829

DIESEL ENGINE EXHAUST SMOKE.

(Diizeru kikan kaikien). Text in Japanese. Sangyo Kogai (Ind. Public Nuisance), 6 (9):547-552, Sept. 25, 1970. 4 refs.
Kazuo Takei.

Identifiers: *Diesel engines, *Control methods, Japan, Engine exhausts, Odors, Smokes, Fuel additives, Maintenance, Aldehydes, Hydrocarbons, Barium compounds, Carbon monoxide, Nitrous oxide (n2o).

Although generally considered less objectionable and dangerous than petrol engine exhausts, diesel engine exhaust gases nevertheless constitute an important air pollution problem because of their smoke and odor. The chief sources of troublesome emissions are hydrocarbons, nitrous oxides, carbon monoxide, and aldehydes. Suppression of pollutants in diesel exhaust is the subject of a wide research effort, with particular emphasis on barium-containing fuel additives. The main causes of unusually black smoke are often inadequate engine installation and tuning, such as improper adjustment of the injection pump. Thus, diesel smoke can be suppressed principally by effective maintenance. Smoke from an old or overloaded engine can best be controlled by effective use of the barium additives.
APTIC-24845

REBIRTH OF A BOILERHOUSE.

For primary bibliographic entry see Field 02.
APTIC-24854

AEROSOL STUDIES IN THE REACTOR SAFETY PROGRAM AT OAK RIDGE NATIONAL LABORATORY.

J. Air Pollution Control Assoc., 18 (10):675-677, Oct. 1968.
R. J. Davis, J. Truitt, and J. S. Gill.
Identifiers: *Radioactive radiation, *Aerosols, *Reactors (nuclear), Particle size, Filters, Aerosol generators, Humidity, Iron compounds, Uranium compounds, Zirconium compounds, Oxides, Iron oxides, Flow rates, Particle growth, Temperature.

Several series of experiments are being conducted to determine the characteristics of radioactive aerosols that might be released from nuclear reactors in the event of an accident. Most of the experiments concern the stainless steel oxide, zirconium dioxide, or uranium dioxide particles that would constitute the aerosols released from a water-cooled, UO2-fueled reactor. The size distribution of these particles will be measured as a function of initial concentration, turbulence, humidity, and time. If the distribution is stable over a reasonably wide range of collections, the calculation of particle removal rates from a reactor containment due to coagulation and settling will be a simple problem. Growth of the particles in high humidity and condensing steam will be studied to obtain a correlation between particle size distribution and growth. The correlation will permit calculations of particle removal rate from a containment by enhanced settling. In addition, efficiencies of absolute, fibrous filters for collection of the particles will be measured as a function of velocity, humidity, and temperature. A fourth series of experiments will examine particle contents and particle size distribution in aerosols formed in a Pu02-fueled, sodium-cooled reactor. The two types of aerosol generators planned for the experiments are described.
APTIC-24875

THE HYGIENIC ASPECTS OF THE PRODUCTION AND USE OF LEAD ANTIKNOCK COMPOUNDS.

For primary bibliographic entry see Field 07.
APTIC-24876

LEAD AND AIR POLLUTION: AN ANALYSIS OF THE MORSE REPORT.

Special Report, 12p., 1967 (*). 5 refs.
Personal Author Not Recorded.
Identifiers: *Lead compounds, *Proposals, *Gasolines, *Fuel additives, Automotive emissions.

Citing the possible adverse effects of gasoline lead additives on human health, modification of atmospheric processes, and deactivation of catalysts in devices for controlling engine exhaust emissions, the Morse Report to the Commerce Department recommended immediate restrictions on leaded gasoline. According to the Ethyl Corporation, this recommendation is directly contrary to the overwhelming weight of scientific evidence. Lead compounds do not contribute to photochemical smog (the most widespread air pollution problem). Only half or less of lead in gasoline is exhausted in particles significantly small to be suspended in air. A portion is retained in the engine and exhaust systems, and of the lead exhausted, the larger and heavier particles fall to the ground and do not become airborne. A number of catalytic exhaust devices, including one developed by Ethyl, have worked well with leaded gasoline and have met previous California standards. No evidence has been obtained in clinical studies suggesting that significant, subtle, or unrecognizable changes are occurring in the general population as the result of exposure to environmental lead, levels of which (according to the World Health Organization) are no greater than they were 20 years ago. Before any action is taken to restrict lead usage, research should be carried to the point where there is adequate data on which to base a decision.
APTIC-24877

SULPHUR COMPUNDS IN KRAFT PULP MILL EFFLUENTS.

Can. Pulp Paper Ind. (Vancouver), 16 (3):35-43, March 1963. 8 refs.
A. E. Werner.
Identifiers: *Sulfur compounds, *Toxic tolerances, *Kraft pulping, *Black liquor oxidation, Animals, Health impairment, Canada, Paper manufacturing, Water pollution, Sodium compounds.

Kraft pulp mills convert biologically harmless sodium sulfate into a variety of sulfur-containing compounds, many of which are quite poisonous when emitted into streams and allowed to pollute the water. A historical perspective of kraft mill effluents and control techniques is presented, and a chemical analysis of the effluents is given in tabular form. The effluent is composed of several process streams, all of which ultimately derive their sulfur from black liquor. Samples of black liquor were obtained and analyzed by gas chromatography for volatile and toxic sulfur compounds. Basic black liquor chemistry, separation, and fractions are discussed. The hypothesis that detoxification of black liquor is caused by raising the oxidation state of sulfur in some of its constituent compounds is tested by exposing the organism Daphnia pulex to a range of concentrations of the toxic solution under controlled laboratory conditions. A lethal concentration, one which kills 50% of the organisms tested, is determined. It is considered to be a much more sensitive and reliable index of toxicity than previous standards are.
APTIC-24902

IS IT POSSIBLE TO BUILD AND OPERATE A COMPLETELY ODORLESS KRAFT MILL*

For primary bibliographic entry see Field 02.
APTIC-24903

MONITORING OF SO2 IN THE VICINITY OF COAL-FIRED POWER PLANTS--TVA EXPERIENCES.

For primary bibliographic entry see Field 04.
APTIC-24913

AIR POLLUTION IN HOLLAND.

For primary bibliographic entry see Field 02.
APTIC-24915

REMOVAL OF SULFUR DIOXIDE FROM POWER-PLANT STACK GASES.

For primary bibliographic entry see Field 02.
APTIC-24916

THE REVAPORIZATION OF LIQUEFIED NATURAL GAS.

For primary bibliographic entry see Field 02.
APTIC-24919

ENEMIES IN THE AIR.

For primary bibliographic entry see Field 02.
APTIC-24920

SULFUR IN IRON- AND STEELMAKING.

In: Problems and Control of Air Pollution. F. S. Mallette (ed.), New York, Reinhold, 1955, Chapt. 18, p. 202-214.
T. P. Colclough.
Identifiers: *Iron, *Fuels, *Primary metallurgical processing, *Sulfur compounds, Steel, Stack gases, Combustion.

One of the essential features of the manufacture of iron and steel is that, no matter what the sulfur content of the raw materials used may be, the sulfur content of the finished iron or steel product shall not exceed 0.05%. In the manufacture of the coke used, some 60% of the sulfur in the raw coal is retained in the coke; 40% is found in the tar and coke-oven gas. This sulfur is removed when the gas is used for public utility purposes and can, under certain conditions, be removed economically when the gas is used for steelmaking or other industrial processes. Some 14% of the total sulfur in the coal is contained in the stack gas from the ovens where unpurified gas is used for underfiring. In the smelting of pig iron, the whole of the sulfur present in the coke, ore, and other raw materials, is absorbed in the blast furnace slag with the exception of a small percentage of the iron itself. No sulfur-bearing gases are formed. In the steelmaking operation, the sulfur removed from the metal is retained in the furnace slag. Chimney gases from the furnaces carry away all the sulfur dioxide formed by the combustion of the sulfur, in the fuel. The same conditions apply to the rolling and forging operations. Viewed broadly, the iron and steel industry presents no unique problem with regard to pollution of the atmosphere by sulfur. The only source of sulfur emissions is the combustion of fuel, and the elimination of this pollution is shared in common with all fuel users. Solutions to the problem are a reduction of the sulfur content of the fuel supplied and/or the removal of the sulfur-bearing constituents of the stack gases. (Author summary modified)
APTIC-24928

UTILITY RESPONSIBILITY FOR PROTECTION OF THE ENVIRONMENT.

Arizona Law Rev., 10 (1):68-73, Summer 1968.
(Presented at the Federal Bar Association Bureau of National Affairs Briefing Conference, Washington, D. C., March 15, 1968.)
Charles F. Luce.
Identifiers: *Socio-economic factors, *Electric power production, Costs, Ethnic factors, Stack gases, Particulates, Nuclear power plants, Control equipment, Sulfur dioxide.

Not only must the public utility supply today's needs of its customers for electric energy, it must forecast what those needs will be decades into the future, and make investment commitments of large sums of capital based upon the forecasts. Today a new and even larger concept of utility responsibility is emerging, and it extends not only to concern for the natural environment, but also for the social and economic environment of the communities which are served. The new concept of public utility responsibility is not easily applied. For example, should a utility spend $140 million to put 25 miles of transmission lines underground when they can be placed overhead for 12 million*

If so, who should pay the added costs" In 1967 Con Edison's plants contributed less than half of the sulfur dioxide in New York City's air and about 15% of the particulates, but by 1980 it expects to generate 75% of its electricity in nuclear plants, thus eliminating the smokestacks. Approximately $150 million has been spent on air pollution control devices, including precipitators that remove 99% of the ash from the stacks of the coal burning plants. To make the city less noisy, Con Edison is procuring new and quieter equipment to break the city pavement, and installing transformers which produce a minimum hum. Thirty percent of the new employees last year were Negroes and Puerto Ricans, while a job training program was offered for high school dropouts.
APTIC-24951

THE WESTERN COAL DEPOSITS: A NATIONAL SOURCE OF POWER.

Brookhaven National Lab., Upton, N. Y., Dept. of Applied Science, 28p., Nov. 1969. 40 refs. NTIS: BNL-50187
M. Steinberg, J. Powell, and B. Manowitz.
Identifiers: *Coal resources, *Magnetohydrodynamics (mhd), *Gasification (synthesis), Costs, Electric power production, Transportation.

To unlock the reserves of the sub-bituminous and lignite coal fields of Montana, North Dakota, Wyoming, and Alaska, it is proposed that large power plants of -3000 Mw (e) capacity be located in coal fields served by open-strip mining of the relatively shallow thick layers of coal. An efficient power cycle is conceived that uses gasification for removal and possible recovery of U-bearing ash and production of gas which can be burned with air in a large magnetohydrodynamics generator for the production of high voltage dc. The dc can then be directly transmitted in a high-capacity, long-distance cryogenic line. Of the alternatives of shipping coal, gas, or electrical power to the large power-consuming centers of the west and east, the latter is the most desirable and inherently the most economical. It is estimated that 100,000 MW (e) could be piped to the west coast and could interconnect with hydropower from the north in one big western loop; another 100,000 MW (e) could be piped to the east and south, interconnecting with the Illinois, West Virginia, and Pennsylvania coal fields. The entire country would thus be looped with electrical transmission carriers connecting with main energy sources from which local power grids can draw in preparation for an all-electric economy. The nuclear plants can either be located at the same sites as the coal plants or spotted along main feeder grids around the country. Investment costs for 10 plants giving a total of 50,000 MW (e) would be 4.35 billion dollars; costs of transmission lines for 1000 miles would be 2.46 billion dollars. It is noted that locating the power cycle at the mine site and the method of transmission, would remove the air pollution problem from the cities and allow cleaner and quieter use of electrical power at the consuming center. Electron transmission, unlike gas transmission, does not require the construction of an electrical power plant at the energy consuming center.
APTIC-24955

TESTING PROCEDURES AND EQUIPMENT.

For primary bibliographic entry see Field 03.
APTIC-24960

SOOT OBTAINED FROM SOLID FUELS.

(Sazhi ot tverdykh topliv). Text in Russian.
Gigiena i Sanit., no. 7:85-87, 1970. 11 refs.
V. Mashek.
Identifiers: *Combustion products, *Soot, *Fuels, *Coke, Czechoslovakia, Ashes, Coal, Chemical composition, Arsenic compounds, Benzo (3-4)pyrene, Iron compounds, Silicon dioxide, Sulfur compounds, Combustion, Wood.

Analysis of soot samples taken in the vicinity of the city of Ostrava, Czechoslovakia, and resulting from the combustion of coke, anthracite, lignite, lignite briquets, or wood are reported. About half of the material collected consisted of silicon dioxide, with 2-9% iron, 0.3-0.6% sulfur, and trace amounts of arsenic. Specific surface of the soot was low (2.5-16 sq m/g) while ash content ranged from 28 to 82%. Benzo (a)pyrene content was lowest in coke soot, (0.1-0.2 microg/g) considerably higher in soot from wood (11.5-28.1 microg/g), and anthracite (7.5-9.2 microg/g); the mode of burning was more important than the type of fuel burned.
APTIC-25545

OBJECTIONABLE SOOT EMISSIONS.

(Zur Frage des Auftretens von Belaestigungen durch Russ). Text in German. Oeffentl.
Gesundheitswesen (Stuttgart), 32 (7):346-348, July 1970. 3 refs.
H. Kettner, and R. Langmann.
Identifiers: *Soot, Standards, Maximum allowable concentration, Germany, Acid smuts, Coal tars, Combustion products, Combustion gases, Smog, Coke, Electric power production, Incineration, Kilns, Primary metallurgical processing, Domestic heating, Open burning, Solid waste disposal, Aircraft, Internal combustion engines, Trains, Sulfuric acid, Benzo (3-4)pyrene.

Soot emission sources include household furnaces, internal combustion engines, small industries, thermal power plants, coke ovens, airplanes, nonferrous metal smelting plants, railroads, incinerators, carbon black works, incinerators of agricultural residues, forest fires, fires from burning old tires, from old oil and from tar. Soot is not harmful when pure but soot from sulfur containing [illegible] oil (smut) contains considerable quantities of sulfuric acid. Soot is also a carrier of cancerogenic 3,4-benzopyrene in smogs and is a contributory factor in the formation of smog. Soot is objectionable as a deposit. An objective soot emission test filters a dust precipitate deposited in a month through a glass wool filter and measures the blackness of the stain by an optical electric reflectometer. The thus obtained soot pollution index is a dimensionless number which calculated for 1 day lies between 0.2 and 3. This method permits the setting of norms of maximally permissible soot emissions which has hitherto not been done.
APTIC-25549

THE EFFECTS OF LEAD ADDITIVES ON REACTIONS IN EXHAUST SYSTEMS.

In: Project Clean Air. California Univ., Berkeley, Thermal Systems Div., California Univ. Res. Proj. S-1, 23p., Sept. 1, 1970.
D. S. Smith, R. F. Sawyer, C. A. Frondizi, and R. C. Carr.
Identifiers: *Engine exhausts, *Fuel additives, *Lead compounds, Internal combustion engines, Hydrocarbons, Carbon monoxide, Nitric oxide (no).

The continued reaction of carbon monoxide, nitric oxide, and hydrocarbons in the exhaust system of an internal combustion engine and the effect of lead alkyl on exhaust system reactions were investigated. The investigation included variations in the lead content of fuel, mixture richness, and compression ratio. The exhaust gas samples were drawn from locations six inches downstream to 40 inches downstream of the exhaust port. The exhaust gas was 600 C and at approximately atmospheric pressure in the test section. No measurable exhaust system reactions were observed for any of the sampled species. (Author abstract)
APTIC-25581

NITROGEN DIOXIDE POISONING IN SILO ATMOSPHERES. (SILO-FILLERS' DISEASE).

For primary bibliographic entry see Field 07.
APTIC-25586

A PROGRESS REPORT ON CONTROLLING ATMOSPHERIC POLLUTANTS.

For primary bibliographic entry see Field 02.
APTIC-25590

THE CONTROL OF ORGANIC SOLVENTS.

Preprint, Ohio Painting and Decorating
Contractors Association, 9p., 1970. (Presented at the State of Ohio Painting and Decorating
Contractors Association Convention, Nov. 5-7, 1970.)
William L. Polglase.
Identifiers: *Regulations, *Surface coatings, *Los angeles, *Solvents, Emission standards, Smog, Afterburners, Absorption, Process modification.

When engineering studies in the Los Angeles area indicated that that organic emissions from solvent usage were second only to those from gasoline-powered vehicles, a decision was made to regulate solvents classified as either reactive or moderately reactive. These are the solvents that enter into photochemical reactions in the atmosphere and produce smog. Provisions for their control are specified in Rule 66 of the Los Angeles Air Pollution Control District, which restricts emissions from paint bake ovens, heat curing, or heat polymerization in the presence of oxygen to 15 pounds a day. Emissions from all other operations using photochemically reactive solvents (such as paint spray booths and degreasers) are limited to 40 pounds a day. The use of architectural coatings containing reactive solvents is prohibited. Compliance with the regulations can be achieved through the use of afterburners or absorbers, use of solvents formulated from nonphotochemically reactive solvents, or process and equipment modification.
APTIC-25592

IMPROVEMENTS IN OR RELATING TO DEVICES FOR CLEANING EXHAUST GASES.

For primary bibliographic entry see Field 02.
APTIC-25599

METALLURGICAL SMOKE.

For primary bibliographic entry see Field 02.
APTIC-25605

CONTROL DEVICES.

For primary bibliographic entry see Field 02.
APTIC-25632

PROTECTION AGAINST IMMISSION.

For primary bibliographic entry see Field 02.
APTIC-25638

RECOMMENDED GUIDE FOR THE PREDICTION OF THE DISPERSION OF AIRBORNE EFFLUENTS.

For primary bibliographic entry see Field 05.
APTIC-25682

AIR POLLUTION PROBLEMS IN THE WOOD PRODUCTS INDUSTRY.

(Skogsindustrins luftvardsproblem). Text in Swedish. Solna (Sweden), Statens
Naturvardsverk, 1969, 246p.
Personal Author Not Recorded.
Identifiers: *Maximum allowable concentration, *Sweden, *Kraft pulping, *Paper manufacturing, Costs, Emission standards, Wood, Particulates, Fumes, Control methods, Chlorine compounds, Chlorine, Mercaptans, Sulfur dioxide, Sulfates, Hydrogen sulfide, Sulfites.

The role of air pollution is discussed with reference to the various mechanical, chemical, and semichemical processes involved in the making of wood pulp and wood pulp products such as paper and cellulose. Most attention is given to the sulfate and sulfite chemical processes, with production charts on which are indicated the

points at which emissions are most critical. The major pollutants given off by these processes are discussed, with special emphasis on particulate matter, SO2, and chlorine compounds. A final chapter deals with acceptable emission levels and levels of pollution in the vicinity of pulp plants. Swedish standards for emission and pollution levels are compared with those of other countries, and figures are given for the pollution levels in the immediate vicinity of Swedish pulp mills. A series of appendices give data on such subjects as the costs of installation for certain types of dust separators, the elimination of H2S and other unpleasant odors, and the economic consequences of a transition from a calcium to a magnesium base in plants using a sulfite process. The limits set on atmospheric SO2 content in Sweden are a monthly average of 0.05 ppm, a 24-hour average of 0.1, and a maximum (in any 30-minute period) of 0.25 ppm. The Public Health Institute in Stockholm has set limits for the following organic sulfur compounds: H2S, .00069 mg per cubic meter; methyl mercaptan, .0041 mg; and dimethyl monosulfide, .002 mg.
APTIC-25683

RISE AND GROWTH OF SPACE VEHICLE ENGINE EXHAUST AND ASSOCIATED DIFFUSION MODELS.

For primary bibliographic entry see Field 05.
APTIC-25685

POWER PLANT ASH–A NEGLECTED ASSET.

Mining Engineering, 19 (1): 42-44, Jan. 1967.
Gerard C. Gambs.
Identifiers: *Concrete, *Fly ash, *By-product recovery, Costs, Ashes, Coal, Electric power production.

When coal is burned in electric utility plants, ash is produced in one of several forms. These include fly ash, bottom ash, and bottom slag. At the present time, approximately 20 million tons of these ashes are produced and must be disposed of by the utilities at a cost of $.50 to $2 per ton. However, when used to replace a portion of the cement in a concrete mix, fly ash will produce the highest quality concrete. As much as $.01 to $.02 per million Btu could be taken from the fuel cost for each ton of ash sold which otherwise must be disposed of at a cost. Examples of the use of fly ash concrete are indicated. The relative compression strength of fly ash and regular concrete is presented, as well as the physical and chemical analyses of fly ashes used for construction projects. Fly ash consists principally of the oxides of iron, aluminum, and silica. These combine with the free lime liberated as the concrete ages and form additional cementing materials. The use of fly ash in concrete prevents free lime from being leached. Since the fly ash is substituted for cement on a pound for pound basis, fly-ash concrete can usually be sold for about $1 per cu yd less than regular concrete.
APTIC-25689

CRUDE OIL FUELS TWO 375-MW UNITS IN JAPAN.

Elec. World, 168 (26):25-26, 31, Dec. 25, 1967.
Rokuro Hirose.
Identifiers: *Crude oil, *Sulfur oxides control, Japan, Stack gases, Fuel oils, Residual oils, Electric power production, Sludge, Inspection, Safety equipment.

Crude oil fuels two 375-Mw units at Chita Thermal Power Station of Chubu Electric Power Company, Japan. Even when the cost of additional protective equipment was included, the cost of generating power from the crude oil was 10% below that of generation with residual oil. In the refining process, an estimated 80-90% of the sulfur, as well as other objectionable constituents, becomes concentrated in the residual oil. Thus, burning crude instead of residual oil reduces sulfur dioxide pollution of the air. To guard against fire and explosion when crude oil leaks, gas monitors provide operators with alarm and lamp indications. Patrolmen are also trained to inspect a number of additional items during crude-oil firing. Piping is welded to reduce the possibility of leakage, while other equipment is flanged and grounded to prevent static discharges. For protection against low-viscosity oil, the rotors are plated with a special nickel alloy for wear and corrosion-resistant qualities. Two propellor type agitators prevent accumulation of sludge in one storage tank, and a nozzle type agitator in the other. The crude oil flame is shorter than that of residual oil. Several other differences between the two fuels are mentioned.
APTIC-25690

LNG PIPELINES - A STATUS SURVEY.

For primary bibliographic entry see Field 02.
APTIC-25697

AN ANALYSIS OF THE DRIVING PATTERN IN THE METROPOLITAN AREA. PART II.

(Toshi ni okeru jidoska no soko patan. Ni). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 6 (10):781-791, Oct. 1970. 30 refs. Part I. Ibid., 6 (9):691-701, Sept. 1970.
Konosuke Nishida, and Yoshinori Ishikawa.
Identifiers: *Urban areas, *Engine operating cycles, *Automobiles, *Mathematical analyses, Japan.

The treatise is presented, based on the assumption that the variation over time of driving speed is governed by a certain stochastic rule such as the Markov process. For simplicity, if the instantaneous speed over a period of time follows a discrete stochastic rule such as the Markov chain, the average variation of the driving speed over time can be obtained. Based on the driving chart recorded by a tacograph, speed can be read off for each five-second interval, and a matrix formed for initial speed divided from 0 to 60 km/h over a 5 km/h interval against the final speed, also divided from 0 to 60 km/h over a 5 km/h interval. For each element of the matrix, transition probabilities were calculated. Other topics include the driving speed per cycle, uniform speed driving, acceleration and deceleration, and optimal mode cycle. The actual driving tests were accomplished in the central area of Kyoto where traffic is heavy; 30 routes were selected.
APTIC-25725

AN ANALYSIS OF THE DRIVING PATTERN IN METROPOLITAN AREA. PART I.

(Toshi ni okeru jidosha no soko patan. Ichi). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 6 (9):691-701, Sept. 1970. Part II. Ibid., 6 (10):781-791, Oct. 1970.
Konosuke Nishida, and Yoshinori Ishikawa.
Identifiers: *Urban areas, *Engine operating cycles, *Automobiles, Japan, Engine exhausts, Statistical analyses.

Although Japan has established measures of preventing air pollution, they were merely followed after the examples of the U. S. In order to evaluate exhaust gas from automobiles, instead of the U. S. 7-mode cycle, the 4-mode cycle was adopted, but there is no proof that it represents the actual conditions of municipal transportation. The degree of pollution was examined based upon the absolute amount of pollutants, and the average traveling cycle of automobiles in Kyoto City was analyzed by a statistical method. There were 3 patterns in 5-mode cycle and 5 patterns in 6-mode cycle, besides the 4 mode cycle pattern. Other results showed that the measurements made in the center of Kyoto City greatly differed from those made in the U. S.
APTIC-25726

THE LIQUEFIED NATURAL GAS PLANT OF THE 'WISCONSIN NATURAL' COMPANY AND ITS SPECIAL CHARACTERISTICS.

For primary bibliographic entry see Field 02.
APTIC-25745

FIRST NATURAL GAS LIQUEFACTION PLANT.

For primary bibliographic entry see Field 02.
APTIC-25748

AN EXPERIMENT STUDY ON EXHAUST GASES OF KEROSENE WITH VEHICLE ENGINE.

(Hakutoyu senryosochi no hyoka). Text in Japanese. Tokyo Gakugei Daigaku Kiyo, Dai-4-Bu (Bull. Tokyo Gakugei Univ., Ser. 4), no. 21:37-41, Oct. 1969. 7 refs.
Ryohei Matsushiba, and Jiro Yoshio.
Identifiers: *Engine exhausts, *Kerosene, *Internal combustion engines, Japan, Gasolines, Air-fuel ratio, Carburetion, Carbon monoxide.

The applicability of kerosene to internal combustion engines was investigated. The engine used was a Toyota R-type 1453 cc; the items investigated were the combustion characteristics, especially the knocking, in the cylinder when gasoline and kerosene was combusted in the engine equipped with standard manifold and a carburetor. The engine performance test was done by the open valve method. The engine speed ranged from 1500 rpm to 4000 rpm with the interval of 500 rpm. The carburetor was adjusted so that the air-fuel mixture would be on the more concentrated side in idling. A firing device was set the same for both gasoline and kerosene. The data were plotted in graphs showing the concentration of carbon monoxide in the exhaust when standard manifolds as well as kerosene manifolds were used and the relationship between CO concentration and air-fuel ratio and induction temperature for the cases when standard as well as kerosene manifolds were used.
APTIC-25754

THE AIR OF ANCHORAGE–TODAY AND TOMORROW.

For primary bibliographic entry see Field 04.
APTIC-25770

AIR POLLUTION FROM IRONFOUNDRY CUPOLAS.

Foundry Trade J. (London), 1962:7p., Dec. 6, 1962. 2 refs. (Presented at the National Society for Clean Air Conference, Harrogate, England, Oct. 1962.)
F. M. Shaw.
Identifiers: *Cupolas, *Control equipment, Iron, Great britain, Combustion gases, Dusts, Soot, Fumes, Smokes, Primary metallurgical processing, Operating variables, Heat transfer.

The more stringent legal requirements of recent years affecting the emission of fumes and grit from cupolas, has raised considerably the cost of control equipment. This additional cost falls most heavily on the shoulders of the smallest foundries with low annual outputs against which to defray it. Trends with regard to foundry size that are altering the character of the industry are examined. The picture is one of declining numbers of foundries, but growth in their size and total output. It would seem then that foundries are tending to become better able--by virtue of their larger size and output--to meet the demands of the law (and public opinion) with reasonable economy. Various types of dust-grit- and fume-control equipment are described and their merits and disadvantages are considered in relation to the cold- and hot-blast cupola. A feature of the study is the breakdown of costs of various types of equipment to the ton of metal melted. Grit and dust emission from cold-blast cupolas can be adequately dealt with by wet arresters. Wet arresters are economically practicable for most medium-sized cupolas but may be too expensive for small, infrequently used cupolas. Smoke can often be consumed in the cupola by building and operating the cupola to achieve complete combustion of the stack gases, and low coke ratios are normally used, it may add considerably to the fuel consumption to ensure combustion. Smoke generated during the lighting-up

period can be eliminated by the use of gas or oil burners to ignite the coke. Metallurgical fume is generated primarily by hot-blast cupolas where it is normally dealt with by dispersion from a tall stack, and sulphur emissions by cupolas are low when compared with boilers of equivalent fuel-burning capacity. (Author abstract modified)
APTIC-25783

OXIDES OF NITROGEN IN THE COMBUSTION PRODUCTS OF AN AMMONIA FUELED RECIPROCATING ENGINE.

Preprint, Society of Automotive Engineers, Inc., New York, 7p., 1968. 19 refs. (Presented at the Society of Automotive Engineers, Mid-Year Meeting, Detroit, Mich., May 20-24, 1968, Paper 680401.)
R. F. Sawyer, E. S. Starkman, L. Muzio, and W. L. Schmidt.
Identifiers: *Combustion gases, *Spark ignition engines, *Nitrogen oxides, Engine exhausts, Fuels, Spectrophotometry, Air-fuel ratio, Ammonia, Hydrocarbons, Reaction mechanisms.

A single cylinder investigation was conducted to determine concentration of nitrogen oxides resulting from combustion of ammonia and air in a spark ignition engine over a range of fuel-air ratios typical of normal engine operation with ammonia. Nitric oxide concentrations exceeded that with hydrocarbons. Spectroscopic observations during the expansion process gave concentrations in some instances an order of magnitude greater than exhaust gas determinations. The results imply a different mechanism for nitric oxide formation with ammonia fuel than with hydrocarbons; some equilibrating process may take place between combustion and exhaust to reduce otherwise even greater than measured exhaust gas concentrations. (Author abstract)
APTIC-25825

INDUSTRIAL ENVIRONMENT CHEMICALS, OCCURRENCE, DECOMPOSITION AND CONSEQUENCES.

(Technische Umweltchemikalien, Vorkommen, Abbau und Konsequenzen). Text in German.
Naturw. Rundschau, 23 (11):445-457, Nov. 1970.
Friedhelm Korte, Werner Klein, and Barbara Drefahl.
Identifiers: *Pesticides, Laboratory animals, Humans, Crops, Ingestion, Metabolism, Breathing, Germany, Soils, Phytotoxicants, Air quality measurements, Emission inventories, Statistical analyses, Arsenic compounds, Chlorinated hydrocarbons, Photochemical reactions.

Global problems caused by industrial chemicals in the environment are analyzed by considering their production, persistence in the environment, spread, change under environmental conditions, and biological consequences. These problems are illustrated by statistics of rising industrial production; tables of current pollution levels; a projection of the production of organic chemicals in the U.S.A. for 1975 and 1980; the identification of 54 chemical compounds currently polluting the atmosphere in the U.S.A.; statistics of pesticide production in the U.S.A.; a table of levels of residual arsenic in the soil of Ontario; a table listing the persistence of chlorinated hydrocarbons in the soil (pesticides); levels of insecticides in the atmosphere, in rain water, and in rivers; the daily intake of pesticides (Dieldrin, DDT,BHC) by humans in food, drinking water, and by breathing; a table of pesticide residues in food; the content of chlorinated hydrocarbons from insecticides in human fat and in milk; studies on the metabolism of C-14 marked insecticides in Aspergillus flavus; studies of the excretion and metabolism of Dien insecticides in Wistar rats; studies on the distribution and elimination of radioactivity from rats 48 hours following an intravenous injection of 19 microg C-14 Dieldrin; the identification of metabolites of pesticides and studies dealing with the Endrin-14-C metabolic rate in plants; the decomposition of Dieldrin and of other chlorinated hydrocarbons through irradiation; the UV irradiation of components of technical chlordane and of 1-alpha-chlordane; the photoisomerization of vinylphosphate; the accumulation of pesticide residues in the nutritional chain; and residues of pesticides in land-based, fresh water, and marine birds.
APTIC-25839

EMISSION OF HYDROGEN CHLORIDE DURING REFUSE INCINERATION.

(Die Emission von Chlorwasserstoff bei der Verbrennung von Hausmuell). Text in German.
Energie (Munich), 22 (10):300-305, Oct. 1970. 5 refs.
Heinz-Walter Truss.
Identifiers: *Incineration, *Solid waste disposal, *Hydrochloric acid, Costs, Plastics, Germany, Cinders, Stack gases, Fly ash, Stacks, Scrubbers, Ground level, Chlorine, Chlorinated hydrocarbons, Combustion.

Since the combustion of pure polyvinylchloride produces about 58% by weight of hydrogen chloride in the resulting combustion gas, and since PVC occurs increasingly in refuse, its content is a factor determining to a large extent the hydrogen chloride content resulting from refuse incineration. Fearing a rise in HCl emission from refuse incineration as a result of the introduction of disposable PVC bottles, a study of the HCl content in waste gas from the incineration of homogenized refuse and the chlorine content in cinders and in fly ash of refuse of a known PVC content was commissioned by the city of Hamburg. Gases from the combustion of 4500 kg refuse of a median PVC content of 0.44% and of a median calorific value of 2000 kcal per kg refuse were analyzed. Results revealed that most of the chlorine content in refuse escapes in the waste gas; only small quantities remain in cinders and in fly ash. The chlorine content in the fly ash rises with rising PVC content in refuse linearly; for cinders, just a rise with rising PVC content could be found. A waste gas flow of 35000 N cu m/hr contained 5000 mg HCl/N cu m. The maximal permissible ground concentration of 0.1 mg/ cu m was reached only by a tenfold emission corresponding to a 6.5 to 7% by weight content of PVC. This relatively high maximal permissible concentration level is due to incinerators having high stacks. Hydrogen chloride emission levels in incinerator waste gases can be reduced by 80-90% by the use of scrubbers which require that their waste water be neutralized. The cost of this purification is high and comes to approximately $2.25 per ton of refuse for an installation with neutralization and dust removal.
APTIC-25862

POWER, POLLUTION, AND THE IMPERILED ENVIRONMENT. II. EAST, MIDWEST, AND WEST COAST: POLLUTION-CONTROL PLANS OF SOME MAJOR UTILITIES; ROLE OF GOVERNMENT IN ENVIRONMENTAL MATTERS; OTHER PROPOSED SYSTEMS FOR REDUCING STACK EMISSIONS.

For primary bibliographic entry see Field 02.
APTIC-25867

EXAMPLES OF CITY-GAS COMBUSTION IN BOILERS.

For primary bibliographic entry see Field 02.
APTIC-25868

AIR POLLUTION FROM MOTOR VEHICLES.

For primary bibliographic entry see Field 02.
APTIC-25886

HOSPITAL INFECTION.

(Innai kansen). Text in Japanese. Kuki Seijo (Clean Air-J. Japan Air Cleaning Assoc., Tokyo), 8 (5):55-59, Nov. 1970.
Yoshinoro Kaneko, and Tokuji Murata.
Identifiers: *Hospitals, *Bacteria, *Fans (blowers), Medical facilities, Japan, Buildings, Dusts, Droplets, Air conditioning equipment, Transport, Humidity, Temperature.

A general review of causes and propagation channels of infections arising within a hospital is followed by a discussion of air-borne infection. The chief carriers are droplets, droplet nuclei, and dust that have more to do with air-conditioning devices in a hospital building. In order to verify an assumption that atmospheric bacteria trapped by a fan coil unit can propagate on the fins, growth and decline of the staphylococci population placed on the fins were examined. Human-infectious yellow staphylococci and human-noninfectious staphylococci suspended in a physiological saline solution were permeated into a sterilized filter paper which was in turn attached to the fin. The number of cocci were counted after a certain number of hours of operation of the fan. The room temperature was 24 to 26 C, and the temperature of the fin was 4.5 C during operation. The number of bacteria decreased from about 100 million to 0.1 million during an 8-hour operation at 4.5 C; when the fan was stopped and the temperature went up, the bacteria was undetectable after 24 hours. On the other hand, bacteria on the filter left under natural drying conditions did not decrease in number, even at 4.0 C. It is inferred, therefore, that dew drops formed on the fins due to low temperature during operation of the fan coil carried the bacteria and eventually discharged them out of the unit. No attempt was made to confirm the existence of bacteria in the drain water, however.
APTIC-25890

LIQUEFIED NATURAL GAS AS INDUSTRIAL FUEL.

For primary bibliographic entry see Field 02.
APTIC-25893

RADIATION SAFETY OF POWER REACTORS. PART I. ENVIRONMENTAL CONTAMINATION AND ITS EFFECTS TO THE PUBLIC.

(Doryokuro no anzensei. Ichi. Kankyo osen to sono eikyo). Text in Japanese. Nippon Genshiryoku Gakkaishi (J. At. Energy Soc. Japan), 12 (10):611-619, Oct. 30, 1970. 15 refs.
Hironobu Watanabe.
Identifiers: *Reactors (nuclear), *Radioactive radiation, Humans, Foods, Thresholds, Japan, Monitoring, Mathematical analyses, Uranium compounds, Oxides, Isotopes.

Radioactive material stored in nuclear power plants are mainly sintered pellets of condensed uranium oxide and those contained in the fuel rods. The emission of radioactive material into the environment may be caused by damage on the protective tubes for fuels. A table of the storage capacity for radioactive rare gases inside the reactor is given by types of nuclides, half-life, energy (MeV), emission rate, and maximum emission rate from exhaust pipes (mCi/sec). Other items discussed are the mechanism of environmental radioactive pollution, the mathematical evaluation of pollution, and environmental monitoring. A table of the concentration factor (CF) for edible sections of various marine life such as fish, shellfish, and seaweeds is presented by types of nuclides, the name of the organism, and CF. The effects of dosages of radioactivity on humans, the exposure quantity in the neighborhood of a power reactor, and exposure to natural radioactivity such as cosmic rays are discussed.
APTIC-25914

EXHAUST EMISSION CHARACTERISTICS OF FOUR-STROKE, DIRECT INJECTION, COMPRESSION IGNITION ENGINES.

Preprint, Society of Automotive Engineers, Inc., New York, 5p., 1968. 5 refs. (Presented at the Society Automotive Engineers., Mid-Year Meeting, Detroit, Mich., May 20-24, 1968, Paper 680420.)
V. S. Yumlu, and A. W. Carey Jr.

Identifiers: *Engine exhausts, *Diesel engines, Automotive emissions, Operating variables, Air-fuel ratio, Hydrocarbons, Carbon monoxide, Nitrogen oxides.

Data are presented to indicate levels of carbon monoxide, nitrogen oxides, and unburned hydrocarbons emitted from typical four-stroke, direct injection diesel engines in the size range commonly found on the highway. At all loads and speeds within the engines' rated range, unburned hydrocarbon and carbon monoxide concentrations are very low when compared to those currently allowed for gasoline engine powered automobiles and light-duty vehicles. Concentrations of these emissions increase with increasing fuel-air ratio by virtue of running at generally lower fuel-air ratios, turbocharged engines tend to produce lower concentrations at equivalent loads and speeds. The reduction of NOx emissions with increasing speed is believed to be a result of shortened exposure time at higher speeds as well as the alteration in fuel injection parameters, such as penetration, number, and size of droplets. (Author conclusions modified)
APTIC-25922

AUTOMOTIVE STARTING AND WARM-UP RESPOND TO GASOLINE VOLATILITY.

Preprint, Society of Automotive Engineers, New York, 27p., 1968. 28 refs. (Presented at the Society of Automotive Engineers Mid-Year Meeting, Detroit, Mich., May 20-14, 1958, Paper 680434.)
H. I. Wilson, R. E. Bertner, J. B. Duckworth, and D. P. Osterhout.
Identifiers: *Gasolines, *Automobiles, *Temperature (atmospheric), *Volatility.

Ten 1966 model cars were tested for the effects of seven fuels with differing volatility characteristics on starting and warm-up performance at minus 20 to plus 60 F. There was found to be a strong relation between air temperature and fuel volatility for acceptable starting and warm-up performance. Increasing fuel volatility generally improved performance at a given temperature or permitted acceptable performance at a lower temperature. The effects of temperature and fuel volatility, however, varied from car to car. Performance of cars with exhaust emission control systems was neither superior nor inferior to cars not so equipped. Reduction of fuel volatility to the 5-6 lb RVP level in areas with prevailing minimum temperatures of 30 F and lower must be expected to produce degraded warming-up performance in a substantial percentage of older cars.
APTIC-25931

HOW AIR POLLUTION CAN BE CONTROLLED IN A PLANT.

For primary bibliographic entry see Field 02.
APTIC-25939

POWER: CONTROL OF RADIOACTIVE EMISSIONS FROM NUCLEAR REACTORS.

In: Project Clean Air. California Univ., Berkeley, Task Force No. 5, Section 8, 7p., Sept. 1, 1970. 7 refs.
Robert C. Erdmann.
Identifiers: *Radioactive radiation, *Reactors (nuclear), Planning and zoning, Regulations, Maximum allowable concentration, Fuels, Air quality measurements, Monitoring, Thermal radiation.

Estimates of the level of radioactivity from natural sources range from 0.1 to 0.8 rem, depending on the area of the world in which an individual lives. Maximum permissible concentrations are derived or secondary standards, which are intended to preclude exposure of the public to the annual dose commitment. Example reactor emissions are presented tabularly. Basic and applied research needed includes a full scale emissions study, monitoring requirements, fuel reprocessing, reactor siting, atmospheric thermal problems, and reactor regulations.
APTIC-25975

AIR POLLUTION CAUSED BY AGRICULTURE AND FORESTRY: DUST.

For primary bibliographic entry see Field 02.
APTIC-25976

CONCERN TO INFLUENCE OF AERIAL BACTERIUM, ESPECIAL, ABOUT PATHOGENIC STAPHYLOCOCCUS E.

(Kukichu saikin no eikyo ni tsuite, tokuni byogensei budokyukin ni tsuite). Text in Japanese.
Kuki Seijo (Clean Air-J. Japan Air Cleaning Assoc., Tokyo), 8 (6):45-51, Dec. 1970. 17 refs.
T. Takahashi.
Identifiers: *Food and feed operations, *Bacteria, Age, Males, Females, Foods, Japan.

A study was undertaken to investigate the possible interrelations between staphylococcus suspended in the air, that originating from employees, and the bacteria detected in processed foodstuff. An inspection was made of 95 confectionaries located in Yokohama and Kawasaki. Precipitating bacteria were arrested by means of a mannitol salt agar culture placed 80 cm above the central floor of each confectionary inspected, from which the staphylococci were then separated. Nasal and pharyngeal rheums were obtained from the workers and inspected. Bacteria were detected in 146 of 190 culture medium plates placed in the factories, while pathogenic staphylococcus was detected in 8 or 5.5% of the samples. Japanese type confectionary showed a detection rate 96.5% higher than the Western type of confectionary, with 7 out of the 8 pathogenic staphylococcus cases. Staphylococcus was also found in 18.9% of 332 workers. Although further analysis showed no specific relation with sex, women in the 30-44 age group had the highest rate.
APTIC-26012

ON THE AIR POLLUTION BY RED OCHRE FACTORIES IN MITSU-CHO. OKAYAMA PREFECTURE, JAPAN.

For primary bibliographic entry see Field 04.
APTIC-26029

AUTOMOTIVE ENGINE DESIGNING AND GASOLINE.

(Jidoshayo kikan no sekei to gasorin). Text in Japanese. Sekiyu Gakkai Shi (J. Japan Petroleum Inst. Tokyo), 13 (11):39-57, 1970. 18 refs.
Personal Author Not Recorded.
Identifiers: *Automotive emissions, *Engine operation modification, *Engine design modification, Construction materials, Japan, Gasolines, Operating variables, Air-fuel ratio, Carburetion, Design criteria, Hydrocarbons, Aluminum compounds, Carbon monoxide, Nitrogen oxides.

The engine compression ratio, fuel system's carburetor factors, and other elements which affect engine performance are discussed. In designing a carburetor, the main problem is to achieve better fuel atomization without sacrificing highspeed performance. Various approaches which are being made to accomplish this include special carburetor design, heating the intake air or fuel mixture, and fuel modification. Aluminum alloy is viewed as a promising construction material for weight reduction and higher engine performance. Properties of materials suited to make various automotive engine parts, such as pistons, valves, and the cam shaft are described. Relationships between gasoline properties and engine performance are also reviewed. The manner in which engine design affects exhaust gas emissions is discussed in detail. Countermeasures are included, as well as data pertaining to ignition time and emissions of carbon monoxide and hydrocarbons. The air-fuel ratio is discussed in relation to nitrogen oxides.
APTIC-26038

DUST AND SOOT NUISANCES AT A METALLURGICAL COKING PLANT AND IN ITS ENVIRONMENT.

(Ueber Staub- und Russbelaestigungen auf einer Huettenkokerei und in deren Umgebung). Text in German. Gesundh. Ingr., 91 (11):323-326, Nov. 1970. 7 refs.
H. Kettner, and V. Masek.
Identifiers: *Maximum allowable concentration, *Dusts, *Coke, *Air quality measurements, Annual, Diurnal, Czechoslovakia, Germany, Industrial areas, Residential areas, Combustion products, Soot, Coal, Furnaces, Dust fall, Soot fall, Benzo (3-4)pyrene.

The maximum permissible dust emission in West Germany for inhabited areas is 0.42 g/sq m/day as an average of 12 monthly averages. For industrial areas, the tolerated level is higher, 0.85 g/sq m/day as an average of 12 monthly averages. In Czechoslovakia, the respective levels are 150 t/sq km/year for inhabited areas, and 10 mg dust/cu m for industrial areas. Gravimetric dust emission measurements performed at 19 sites of a coking plant and in its vicinity near Ostrava in Czechoslovakia yielded levels which by far exceeded the stipulated norms; in one case, a daily emission level of 11.3 g/sq m/day was recorded. The maximum 3,4-benzpyrene content found was 38.5 micrograms/g dust. The dust consisted of coke and coal particles and of soot flakes. This emission resulted even though the coking plant met all waste gas purification requirements prescribed by law. Thus, additional measures will have to be instituted to reduce dust emission, especially during the charging operations of coke ovens.
APTIC-26040

LIGHT OIL AS DIESEL ENGINE FUEL AND ITS PROBLEMS.

(Diizeru keiyu no doko to mondaiten). Text in Japanese. Sekiyu Gakkai Shi (J. Japan Petroleum Inst., Tokyo), 13 (11):13-22, 1970. 131 refs.
N. Yasui.
Identifiers: *Fuel oils, *Diesel engines, Japan, Engine exhausts, Odors, Smokes, Automobiles, Timed fuel injection, Aldehydes, Carbon monoxide, Nitrogen oxides, Sulfur compounds, Combustion.

The use of light oil as a fuel for internal combustion engines, particularly automobile diesel engines, is discussed. In Japan, consumption of light oil by automobiles reached 10.8 mil kl in 1970 and is projected to reach 16.7 mil kl in 1974. Quality standards by which to classify light oil are briefly reviewed. The all-purpose light oil used in Japan has an average specific gravity of 0.830-0.833, an average viscosity of 3.1-3.6 CST, an average sulfur content of 0.5-7%, and an average cetane value of 54-57. Temperatures required for 90% distillation and pour point are 205-312 C and -17 to -15 C, respectively. The direct injection system is increasingly preferred over pre-combustion chambers for 4-cycle, high-speed diesel engines. Problems associated with obtaining high-speed combustion in the direct injection systems are noted, as are the problems of reducing combustion noise and density of exhaust gas. Compared to gasoline engines, diesels omit much less carbon monoxide and smoke but more nitrogen oxides and aldehydes; the latter contribute to the odor of diesel smoke. The mechanism of diesel smoke generation, its measurement and control, and other related problems are also considered.
APTIC-26048

ELIMINATION OF POLLUTION CAUSED BY FOUNDRY WORKS.

For primary bibliographic entry see Field 02.
APTIC-26058

PROSPECTS FOR ELECTRIC VEHICLES. A STUDY OF LOW-POLLUTION-POTENTIAL VEHICLES--ELECTRIC.

For primary bibliographic entry see Field 02.

APTIC-26083

A REVIEW AND COMPARISON OF SELECTED UNITED STATES ENERGY FORECASTS.

Battelle Northwest, Richland, Wash., Pacific Northwest Labs., 79p., Dec. 1969. 20 refs.
W. A. Reardon, J. A. Merrill, L. D. Jacobson, and W. L. Bathke.
Identifiers: *Trends, *Nuclear power plants, Coal resources, Natural gas, Fuel oils, Magnetohydrodynamics (mhd), Steam plants, Research methodologies.

Energy projections of a number of forecasts are collected and compared, and the methodology used by the various forecasters assessed. According to the forecasts examined, energy consumption in the year 2000, including non-fuel uses, will be about 170,000 trillion British thermal units if real gross national product grows at four % per year. Although this figure appears reasonable, it does not reflect the emerging concern for protecting the environment. It is possible that future government policy in regard to environmental quality and conservation will lead to a lower level of total energy consumption than would otherwise occur. In addition, the figure quoted may not adequately reflect possible changes in efficiency of energy conversion and changes in the structure of consumption, especially the larger share going into electric power production. Oil (including natural gas liquids) is expected to remain the nation's largest energy source through 2000 and natural gas (dry) the second largest source. Of three projections providing figures for both nuclear power and coal at the end of the century, one estimates that coal will provide slightly more energy than nuclear, another estimates just the opposite, and one foresees a large margin for nuclear. Nuclear generation is expected to exceed hydroelectric generation sometime in the 1975-1980 period. In the case of individual fuels, the forecasts assume unlimited availability at no change in relative prices. This assumption seems of questionable validity even for the next decade.
APTIC-26085

AIR POLLUTION CAUSED BY AGRICULTURE AND FORESTRY: PESTICIDES.

In: Project Clean Air. California Univ., Berkeley, Task Force No. 5, Section 7, 5p., Sept. 1, 1970. 28 refs.
Victor P. Osterli.
Identifiers: *Pesticides, Plant damage, Occupational health, Health impairment, California, Crop spraying, Transport, Volatility.

The introduction of pesticides into the environment for the control of insects, plant diseases, and weeds is generally accomplished by aerial (80%) and surface applications (20%); drift of sprays and dust over relatively long or short distances is recognized. Pesticides may be transported over longer distances when attached to dust particles in the air. Perhaps the most significant and recognized damage to vegetation is where the air mass is contaminated with 2,4-D and its related compounds. In California, high-volatility materials are outlawed. Even the low volatility compounds cannot be safely used in areas where susceptible crops such as grapes, cotton, and tomatoes are grown. Although the potential danger of pesticides to operators and handlers is well known and well documented, less is known concerning the exposure of the general population to pesticides in the atmosphere. Because of the concern regarding pesticide contamination of the atmosphere and its long-term effect upon the environment, surveys over widely distributed geographical areas have been conducted in both urban and rural locations.
APTIC-26093

STATE OF AFFAIRS AND PROBLEMS INVOLVING AUTOMOTIVE FUEL GASOLINE.

(Jidosha gasorin no doko to mondaiten). Text in Japanese. Sekiyu Gakkai Shi (J. Japan Petroleum Inst., Tokyo), 13 (11):23-38, 1970. 71 refs.
Personal Author Not Recorded.
Identifiers: *Automotive emissions, *Gasolines, Japan, United states, Engine exhausts, Fuel evaporation, Automobiles, Fuel additives, Aromatic hydrocarbons, Lead compounds, Combustion, Volatility.

A very intensive and analytical report was prepared covering many aspects of automotive fuel, including combustion gas emission problems and other reference data. This chapter presents a comparison between Japanese gasoline and that used in the United States, which reveals a greater aromatic hydrocarbon content and higher specific gravity for the former. Volatility is related to the shape, temperature, and other characteristics of the manifold. Although a lower volatility results in lower evaporation losses, this adversely affects starting and warming-up engine operations. Gasoline properties and their relation to evaporative loss are depicted graphically. Lead anti-knock additives are mentioned, and deposits in the combustion chamber are discussed in relation to the amount of lead added. The combustion process in various parts of the engine is described.
APTIC-26100

TECHNOLOGY OF POLLUTION-CONTROL IN ZINC AND LEAD SMELTING.

(Aen oyobi nanari serien ni okeru kogai boshi gijutsu). Text in Japanese. Kinzoku (Metals) (Tokyo), 41 (1):118-121, Jan. 1 and 15, 1971.
M. Ichijo.
Identifiers: *Cadmium compounds, *Primary metallurgical processing, *Control methods, *Lead, *Zinc, Japan.

Cadmium production by zinc smelting is a serious pollution problem, even though the amount generated is very small (about 1/400 of zinc). The pollutant is a source of contamination whether discharged with smelter effluent or contained in solid waste. Though present in an even smaller proportion, cadmium is also found in lead; and both lead and zinc production are increasing. Flow sheets are given for both wet and dry zinc smelting processes and lead smelting processes. Attempts to recover cadmium and recycle it to the smelting operation have not significantly reduced emissions. Currently the effluent is being treated with calcium carbonate or calcium hydroxide. A process for recovering these compounds as sulfides is in the development stage. Other control methods under study are ion exchange, multi-stage flush condensation, and the Duval and cyanide methods used in copper smelting.
APTIC-26107

SYMPOSIUM: RECENT PROBLEMS ON AUTOMOTIVE FUELS.

For primary bibliographic entry see Field 02.
APTIC-26134

PRESENT SITUATION AND OUTLOOK OF FLUORIDES AIR POLLUTION PREVENTION TECHNOLOGY--TACKLING WITH ALUMINUM SMELTING POLLUTION.

(Fukkabutsu ni yoru taiki osen boshi gijutsu no genjo to tenbo -arumi seiren kogai ni torikumu). Text in Japanese. Kinzoku (Metals) (Tokyo), 41 (1):122-125, Jan. 1 and 15, 1971. 9 refs.
F. Tsuda.
Identifiers: *Aluminum, *Primary metallurgical processing, *Fluorides, Chronic, Plants (botany), Fluorosis, Iron, Steel, Japan, Coal, Fertilizer manufacturing, Mineral processing, Scrubbers.

Sources of fluoride pollution and the effects of fluorides on man and plants are reviewed. Aluminum electrolysis uses cryolite which is 54% fluoride. Raw materials containing fluorides are also used in the production of phosphate fertilizers and iron and steel. Raw materials containing smaller amounts of fluorides are required for the production of glass fibers, bricks, tiles, cement, and porcelain. Coal burned by thermal power stations can be a problem since coals contain 20-295 ppm of fluorides, averaging 120 ppm. Fluorides affect plants more than any other atmospheric pollutant, accumulating in a large number of species in polluted areas. Fluorides affect man in two ways, directly through air pollution or indirectly through contaminated vegetation. They are present in considerable amounts in both green vegetables and rice. Symptoms of chronic fluoride poisoning in man are abnormal hardening of bones and spots on teeth. Cases of chronic poisoning have appeared among workers exposed to cryolite dust and among individuals whose drinking water contains more than 6 ppm fluorides. Existing technology, the use of scrubbers for controlling fluoride emissions from aluminum electrolysis or electric furnaces, is effective only with concentrations up to 1 ppm. New production technologies should be developed which dispense with the use of raw materials containing fluorides.
APTIC-26136

LUCAS BACK THE ZINC-AIR BATTERY.

For primary bibliographic entry see Field 02.
APTIC-26140

A METEOROLOGICALLY OPERATED STACK CONTROL SYSTEM.

For primary bibliographic entry see Field 02.
APTIC-26148

AECIOSPORE RELEASE IN GYMNOSPORANGIUM.

Can. J. Botany, 47 (7): 1027-1032, 1969. 24 refs.
S. M. Pady, C. L. Kramer, and R. Clary.
Identifiers: *Spores, Diurnal, Humidity, Precipitation.

Aeciospore release was studied in Gymnosporangium clavipes Cke. and Pke., G. globosum Farl., and G. juniperi-virginianae Schw. under natural and controlled conditions. In nature diurnal periodicity occurred in all species with spores released in the morning as humidity dropped. Precipitation caused immediate release in G. clavipes and G. globosum but prevented release in G. juniperi-virginianae because of the hygroscopic peridia. Under constant conditions of 70 F, 90% R.H., photoperiod 12 hours beginning at 8 am, spore release in G. clavipes and G. globosum appeared to be continuous. In G. juniperi-virginianae under the same conditions there were twin peaks, a major one between 8 and 10 am and a smaller one at 8-10 pm. With a dew cycle inserted for 4-12 hours, G. clavipes and G. globosum released spores during the dew period but the hygroscopic peridia of G. juniperi-virginianae closed the opening, preventing aeciospore release. Upon return to 90% R.H., spore release in G. clavipes and G. glogobsum declined for 3-9, then returned to a steady level but G. juniperi-virginianae released great numbers of spores 2-4 hours after the dew period, because of the action of the peridial strands. In all species, fresh dry spores are shrunken and irregular, expanding immediately in contact with free water, shrinking as water is lost. Spore release is correlated with free moisture in G. clavipes and G. globosum and in all species with rapidly declining humidities. (Author abstract)
APTIC-26161

AIR POLLUTION: FURNACE TYPES AND SIZES DICTATE MOST EFFECTIVE CONTROLS. PART I.

For primary bibliographic entry see Field 02.
APTIC-26166

REDUCING JET POLLUTION BEFORE IT BECOMES SERIOUS.

For primary bibliographic entry see Field 02.
APTIC-26181

CLOSED-TOP CUPOLAS END AIR CONTAMINATION.

For primary bibliographic entry see Field 02.
APTIC-26184

ICE NUCLEI FROM DIRECT REACTION OF IODINE VAPOR WITH VAPORS FROM LEADED GASOLINE.

Science, 158 (3802):800, 1967. 3 refs.
Austin W. Hogan.
Identifiers: *Tetraethyl lead, *Iodine compounds, *Nucleation, Fuel tank evaporation, Carburetor evaporation losses, Gasolines, Fuel additives, Condensation (atmospheric), Ice, Vapors, Reaction mechanisms.

Large amounts of ice nuclei, active at -15 C or colder, were generated by mixing vapors from leaded gasoline with iodine vapor. When unleaded gasoline was substituted for leaded gasoline, no particles could be observed. In a bottle with a capacity of 2 liters, the reaction between iodine vapors and leaded gasoline vapors produced more than 1,000,000 Aitken nuclei per cu cm. These results suggest that evaporative losses from carburetors and gas tanks can be a significant source of atmospheric lead and freezing nuclei.
APTIC-26191

HYDROCARBON CONTROL FOR LOS ANGELES BY REDUCING GASOLINE VOLATILITY.

For primary bibliographic entry see Field 02.
APTIC-26199

EFFECTS OF GASOLINE ADDITIVES ON CARBURETOR AND PCV SYSTEMS PERFORMANCE AS THEY RELATE TO EXHAUST EMISSIONS.

For primary bibliographic entry see Field 02.
APTIC-26200

A CENTRALIZED INCINERATION FACILITY FOR INDUSTRIAL WASTE DISPOSAL.

For primary bibliographic entry see Field 02.
APTIC-26204

POWER AND INDUSTRY: CONTROL OF NITROGEN OXIDE EMISSIONS.

For primary bibliographic entry see Field 02.
APTIC-26226

POWER AND INDUSTRY: HYDROCARBONS AND OTHER ORGANIC SPECIES.

For primary bibliographic entry see Field 02.
APTIC-26231

POWER AND INDUSTRY: PARTICULATES.

For primary bibliographic entry see Field 02.
APTIC-26233

SPECIAL FEATURES OF THE 140 MW TURBINE OF THE DUISBURG POWER PLANT.

(Besonderheiten des 140 -MW- Blockes der Stadtwerke Duisburg). Text in German. Siemens Z., 43 (3):155-159, March 1969. 6 refs.
Werner Seifert, and Gerhard Wolkenberg.
Identifiers: *Steam plants, *Power sources, Germany, Operating variables, Wet cyclones, Process modification, Design criteria.

The turbine built in 1964 by Siemens for the Duisburg power plant as an additional source of electricity had to meet specific local needs with regard to construction, circuit and control. The meet the rising heat consumption of Duisburg, the new block supplies heater current of 2 times 75 G cal/h, the amount projected for 1972. Two preheaters are provided which will be connected to the existing heating system. For peak heat requirement hot water is stored in vertical reservoirs of 900 cu m capacity at 11 atm and at 187 C. The block is so constructed as to meet a peak requirement of 200 MW between 7 am and noon and 50 MW between midnight and 6 am. To render slag discharge dust-free, the slag leaves the boiler furnace in liquid form. A cyclone is provided. Fully automatic equipment is provided for the operation of the turbine, for feed water pumps, for low load boiler control, for the peak load reservoir, and for armature control.
APTIC-26237

NEW PENNSALT HF PLANT.

For primary bibliographic entry see Field 02.
APTIC-26244

MISCELLANEOUS INDUSTRIAL EMISSIONS.

In: Project Clean Air. California, Univ., Berkeley, Task Force 5, Vol. 1, Section 14, 5p., Sept. 1, 1970. 3 refs.
Richard L. Perrine, and Limin Hsueh.
Identifiers: *Industrial emission sources, Asbestos, Odors, Dusts, Basic oxygen furnaces, Open hearth furnaces, Kraft pulping, Coffee-making, Slaughterhouses, Metal fabricating and finishing, Mining, Primary metallurgical processing, Solid waste disposal, Glass fabrics, Control methods, Hydrochloric acid, Hydrofluoric acid, Nitric acid, Asbestos, Sulfuric acid, Mercaptans, Fluorides, Sulfur oxides, Hydrogen sulfide.

Five broad categories of industrial polluters are briefly considered, as well as their kinds of emissions and control problems. The inorganic chemical industry has problems with hydrochloric acid, hydrofluoric acid, nitric acid, sulfuric acid, calcium oxide, chlorine, soaps and detergents. Steel production is a major industry, but the open hearth furnaces are gradually being replaced by the basic oxygen furnace. Although this also produces fumes, the new plants can be constructed with proper control equipment. Foundries may change the work they do from day to day so that control problems are at their worst, but methods to trap particles and fumes are available. The handling of large volumes of minerals normally involves problems with dust, while the special biological effects of asbestos must be noted. Glass fibers can also be a problem, as well as fluoride-containing ores. Copper, lead, and zinc mining and milling operations involve dust problems, while sulfur oxides may be released during smelting. Hydrogen sulfide, mercaptans, sulfide and polysulfides which have very bad odors, and other noxious gases are emitted during wood pulp processing. Typical gaseous emissions from Kraft pulping are presented tabularly. Coffee roasting plants, slaughterhouses, and pickel plants emit strong odors. An areas of concern is new processes to break down waste and return it to a state useful in natural processes without problems of storage. A particularly important point which needs to be considered is site location.
APTIC-26254

AIR POLLUTION CAUSED BY AGRICULTURE, FORESTRY AND THE FOREST PRODUCTS INDUSTRIES: COMBUSTION.

For primary bibliographic entry see Field 02.
APTIC-26255

AIR POLLUTION FROM FLUORIDES.

J. Air Pollution Control Assoc., 6 (2):100-102, Aug. 1956. (Presented at the Air Pollution Control Association, 49th Annual Meeting, Buffalo, May 20-24, 1956.)
Charles R. Williams.
Identifiers: *Fluorides, *Aluminum compounds, *Phosphorus compounds, Cattle, Plant damage, Mineral products, Fertilizer manufacturing, Primary metallurgical processing, Phosphates.

There has been a long history in the country of severe crop and cattle damage in several areas caused by air pollution from fluorides. Rock phosphate and fluorspar and other ores of fluorine compounds are the major sources responsible for this pollution problem. A brief review of production figures for these materials defines the extent of the problem. Phosphate rock is utilized primarily for the production of superphosphates (fertilizers), food and medicinal phosphates, elemental phosphorus, phosphoric acid, ferro-phosphorus, and stock and poultry feed. The important sources are in Florida, Tennessee, Idaho, Montana, Utah, and Wyoming. Utilization of fluorides, particularly in production of aluminum and steel, provides another large-scale source of fluoride pollution. The use of fluorides in the production of aluminum is discussed, as well as the release of fluoride in the production of elemental phosphorus and superphosphates.
APTIC-26258

AIR POLLUTION AND ASSOCIATED HEALTH HAZARDS FROM DIESEL LOCOMOTIVE TRAFFIC IN A RAILWAY TUNNEL.

Occupational Health Rev. (Ottawa), 11 (3):2-15, 1960. 26 refs. (Also: A.M.A. Arch. Ind. Health, Dec. 1959.)
Morris Katz, and R. P. Rennie.
Identifiers: *Tunnels, *Diesel engines, *Air quality measurements, Proposals, Eye irritation, Canada, Particulates, Smokes, Trains, Ventilation, Aldehydes, Hydrogen dioxide (no2).

The results are presented of an intensive study of a railway tunnel environment under conditions of fully dieselized train traffic. Atmospheric sampling tests were conducted around the clock on an 8-hr working shift basis for three days. More than 2000 observations were made to determine the fluctuations and range of occurrence of contaminant concentration under a variety of traffic conditions. There were no abnormal health effects on participants during exposure in the tunnel atmosphere, with the exception of minor cases of eye and throat irritation. However, nitrogen dioxide, aldehydes, smoke, and particulate matter attained high levels during periods of peak train activity. Therefore, installation of appropriate forced-draft ventilation is recommended for the tunnel before full dieselization is introduced to replace electrical operation of trains.
APTIC-26262

ROLE OF THE DAIRY AND FOOD INDUSTRY IN ENVIRONMENTAL POLLUTION CONTROL.

Milk Food Technol., 33 (12):568-570. 4 refs.
(Presented at the New York State Association of Milk and Food Sanitarians, Annual Meeting, Syracuse, N. Y., Sept. 23, 1970.)
David F. Newton.
Identifiers: *Food and feed operations, Education, Management personnel, Public information, Milk, Farms, Engine exhausts, Stack gases, Boilers, Sewage, Solid waste disposal, Diesel engines.

Roles of the dairy and food industry in environmental pollution are examined in terms of a potential or actual polluter, an educator, and a community leader. Wastewater from milk houses and milking parlors and sanitary sewage from farm houses constitute potential pollutants on dairy farms, as does wastewater from milk and food processing plants in rural and urban areas. Boilers and heating facilities in milk and food processing plants are potential sources for air pollutants. Diesel trucks used to haul milk and other foods of processing plants and to retail stores are another important source of pollutants. Most supermarkets and many food warehouses have incinerators to burn combustible refuse, while dairy and poultry farms produce enormous tonnages of manure. Dairies could print statements and suggestions about pollution control on milk cartons; restaurants could have messages about pollution control printed on their place mats. Plant managers and laboratory technicians, many of whom are college graduates, possess a knowledge of science and, hence, can be very helpful to civic and conservation groups in studying and evaluating local environmental problems.
APTIC-26277

AIR POLLUTION ALONG THE MEXICAN-AMERICAN FRONTIER.

(La contaminacion atmosferica en la frontera de Mexico con los Estados Unidos de America). Text in Spanish. Salud Publica Mexico, 12 (2):195-198, March-April 1970. (Presented at the Asociacion Fronteriza Mexicana-Estadunidense de Salubridad, 28th Annual Meeting, Baja, California, March 16-20, 1970.)
Z. Tello.
Identifiers: *Mexico, *United states, *Sources, Abatement, Control programs, Criteria, Federal governments, Research institutes, Urban areas, Electric power production, Incineration, Domestic heating, Solid waste disposal, Vehicles.

If every city with 50,000 or more inhabitants is to be considered a potential source of dangerous air pollution, then there are 36 population centers adjacent to the Mexican-American border, 20 of which are air pollution threats. Of the 21 Mexican communities in this group, 12 have a population above 50,000. Pollution sources may be classified into four categories: automotive vehicles (which contribute 50% of the problem), generation of heat and electric power (15%), elimination of solid wastes, and industrial activity (30%). Only 58% of the electric power produced in Mexico is from hydro electric sources. Of the three communities on the border possessing thermoelectric generators, the largest is at Rosarito in Baja, California with a capacity of 307,000 kilowatts, operated in conjunction with an ocean water desalination plant at Tijuana. The other plants are at Rio Bravo in Tamaulipas (37,500 kw) and at Ciudad Juarez (15,000 kw). A study of the border conditions has led to some proposals, which include the formulation of criteria, acceptable to both countries, for the classification of pollutants and minimum tolerance, air quality standards, concerted action against the emission sources, common agreement as to the incineration of wastes, and agreement on the technological approaches to pollution control.
APTIC-26299

AUTOMOTIVE AIR POLLUTION AND PROBLEMS RELATED TO ITS CONTROL: EXPERIMENTATION WITH A HETEROGENEOUS AFTERBURNER.

(Inquinamento atmosferico da autoveicoli e problemi relativi al suo controllo; sperimentazione di un post-combustore eterogeneo). Text in Italian. Nuovi Ann. Igiene Microbiol. (Rome), 21 (1):1-9, Jan.-Feb. 1970.
Del Vecchio, V. P., Valori A., and Grella and.
Identifiers: *Spark ignition engines, Abatement, Legal aspects, Legislation, Maximum allowable concentration, Laboratory animals, Lung cancer, Italy, Automotive emissions, Vehicles, Benzo (3-4)pyrene.

Air pollution caused by internal combustion engines, and specifically the Otto or spark-ignited engine is discussed. The causes and nature of automotive pollutants, the factors that influence them, and the technological basis for their control are reviewed. Legislation related to this area, passed by various countries, is summarized. Among the significant long-term effects of air pollution, the most serious are respiratory diseases, especially lung cancer, which just recently has increased in frequency in some areas by as much as 30-50 times. Of all deaths due to cancer, lung cancer now occupies the first place in statistics. Recent animal experiments have shown the possibility of inducing experimental cancer in 100% of a group of laboratory animals. Major interest is focused on the aromatic polynuclear hydrocarbons, and especially 3,4-benzopyrene. In the legislative area, the primary problem to be solved at present is the establishment of maximum acceptable concentrations for the various substances in the polluted atmosphere that are known to be harmful to life on the surface. Material on afterburner is not included.
APTIC-26300

2. CONTROL METHODS

SYSTEMS STUDY OF NITROGEN OXIDE CONTROL METHODS FOR STATIONARY SOURCES.

Esso Research and Engineering Co., Linden, N. J., Government Research Lab., Contract PH-22-68-55, Rept. GR-1-NOS-69, 81p., May 1, 1969. 542 refs.
W. Bartok, A. R. Crawford, H. J. Hall, E. H. Manny, and A. Skopp.
Identifiers: *Industrial emission sources, *Control methods, *Nitrogen oxides, Area surveys, Questionnaires, Engine exhausts, Stack gases, Fuels, Steam plants, Scrubbers, Absorption, Adsorption, Excess air, Sulfur dioxide, Catalytic activity, Decomposition, Oxidation, Reduction.

An interim report on a systems study of nitrogen oxide control methods for stationary sources is presented. The nature and magnitude of the stationary NOX problem in the U. S. is defined, and existing and potential control techniques are identified. A comprehensive, selective review of the pertinent literature, resulting in over 600 items of specific interest was conducted. A detailed questionnaire for steam-electric plants selected on the basis of geographic location and fuel type was developed. Nitrogen oxide emissions from combustion sources are estimated by major sectors (including transportation) and fuel type, for the years 1950, 1955, 1960, 1965, 1970, 1975, 1980 and 2000. Stationary sources account for about 55% and transportation for 45% of uncontrolled emissions for the period 1950 through 1980. The contribution of power generation to the NOX emissions from stationary sources is estimated to increase from 45% in 1965 to 57% in 1980 and 64% in the year 2000. Studies of NOX control techniques have concentrated so far on the identification of promising methods. Several new approaches are identified with potential for simultaneous removal of sulfur and nitrogen oxides. In broad categories, decomposition, reduction, sorption and oxidation techniques are studied. Selective NOX reduction techniques with ammonia or possibly with hydrogen sulfide, aqueous caustic scrubbing techniques, a modified version of the lead chamber acid process, and adsorption on some metal oxides appear to be promising. Known catalysts lack sufficient activity for catalytic NOX decomposition. Combustion process modification techniques are potentially the simplest and least costly approaches to the NOX control problem. However, demonstrated technology is quite limited at present. Low excess air combustion, flue gas recirculation, two-state combustion, burner location and spacing, fluidized bed combustion are prime candidates for further study in this area. The applicability of specific techniques (alone or in combination with others) depends heavily on the type and size of combustion equipment, and on the type of fuel used. Formulation of a simple, idealized model for NOX formation in combustion processes has been initiated. This study is aimed at the definition of requirements for more detailed combustion models, which could be used for guiding the design of combustion equipment emitting less NOX. (Author summary modified)
APTIC-12619

SYSTEMS STUDY FOR CONTROL OF EMISSIONS. PRIMARY NONFERROUS SMELTING INDUSTRY. (FINAL REPORT). VOLUME II: APPENDICES A AND B.

Contract PH 86-65-85, Rept. 993, 88p., June 1969. 72 refs. CFSTI: PB 184 885
Personal Author Not Recorded.
Identifiers: *Costs, *Primary metallurgical processing, *Absorption (general), Stack gases, Scrubbers, By-product recovery, Alkaline additives, Sulfuric acid, Copper compounds, Lead compounds, Zinc compounds, Reduction, Flow rates.

A systems study of the primary copper, lead, and zinc smelting industries is presented to make clear the technological and economic factors that bear on the problem of control of sulfur oxide emissions. Sulfur oxide emissions for various types of smelting operations are tabulated, including gas flows and compositions and an analysis of sulfur oxides generation and recovery. Smelter flow diagrams are presented for the control methods of contact sulfuric acid, absorption, reduction to elemental sulfur, lime wet scrubbing, and limestone wet scrubbing. Sulfur oxide recovery processes that were investigated and rejected as not being suitable for economic analysis are listed. Cost estimates for various control processes are given.
APTIC-12751

SYSTEMS STUDY FOR CONTROL OF EMISSIONS. PRIMARY NONFERROUS SMELTING INDUSTRY. (FINAL REPORT). VOLUME III: APPENDICES C THROUGH G.

Contract PH 86-65-85, Rept. 993, 114p., June 1969. 130 refs. CFSTI: PB 184 886
Personal Author Not Recorded.
Identifiers: *Primary metallurgical processing, Costs, Operating criteria, Monthly, Stack gases, Scrubbers, By-product recovery, Absorption (general), Alkaline additives, Winds, Inversion, Topographic interactions, Copper compounds, Lead compounds, Zinc compounds, Reduction.

A systems study of the primary copper, lead, and zinc smelting industries is presented to make clear the technological and economic factors that bear on the problem of control of sulfur oxide emissions. Various sulfur oxides control methods, including scrubbing, absorption, and reduction, are matched with smelter models to determine optimum control and production combinations. A precise analysis of the pollution potential of an individual smelter requires meteorological data for the specific smelter site. The variables that can be considered in such a topographical analysis include inversion frequencies, monthly mean maximum mixing depths, surface winds, and general airflow conditions. An analysis of the U. S. markets for zinc, lead, and copper is presented, as well as markets for sulfur byproducts. A literature review of control methods for sulfur oxide emissions from primary copper, lead, and zinc smelters is included.
APTIC-12777

SYSTEMS STUDY FOR CONTROL OF EMISSIONS. PRIMARY NONFERROUS SMELTING INDUSTRY. (FINAL REPORT). VOL I.

Contract PH 86-65-85, Rept. 993, 188p., June 1969. CFSTI: PB 184 884
Personal Author Not Recorded.
Identifiers: *Costs, *Primary metallurgical processing, *Absorption (general), Operating criteria, Stack gases, Operating variables, Scrubbers, By-product recovery, Alkaline additives, Sulfuric acid, Copper compounds, Lead compounds, Zinc compounds, Sulfur dioxide, Reduction.

A systems study of the primary copper, zinc, and lead smelting industries is presented to make clear the technological and economic factors that bear on the problem of control of sulfur oxide emissions. The nature of smelting practice is described, and potential air pollution problems in smelter areas are revealed. Five processes for the control of sulfur oxides are presented, including contact sulfuric acid, absorption, reduction to elemental sulfur, lime wet scrubbing, and limestone wet scrubbing. Current sulfur oxide emissions from U. S. smelters are given, and forseeable emission trends are discussed. Markets for sulfur byproducts are mentioned, the costs of control by available methods are tabulated, and control method evaluation with plant models is considered. A research and development program for control methods and smelting process technology is recommended.
APTIC-12823

PRESENT STATUS OF DESULFURIZATION TECHNIQUE (1).

(Datsuryu gizutsu no genkyo (1)). Text in
Japanese. Ryusan (J. Sulphuric Acid Assoc.
Japan), 20 (11):247-254, Nov. 1967.
T. Takagi.
Identifiers: *Sulfur oxides control, Japan, Combustion gases, Catalytic oxidation, Fuel oil preparation, Absorption (general), Alkaline additives, Alkalized alumina (adsorption), Manganese dioxide (japanese), Dispersion, Catalysis.

Three methods for the elimination of sulfur in industrial combustion are desulfurization of the crude oil, desulfurization of the exhaust gas, and atmospheric dispersion of the exhaust gas. The last of these is used extensively. The second, desulfurization of the exhaust gas, has been the subject of much study. There are currently five principal processes in use for exhaust gas desulfurization. The manganese oxide method uses powdered MnO (particle dia 10-100 micron) as an adsorbent; the reaction between the sulfur dioxide and the MnO yields MnSO4. The activated carbon method uses activated carbon as an adsorbent. The vanadium 205 contact method catalytically oxidizes the SO2 in the exhaust gas to SO3 at 450 C (Berneck Method, Kiyoura Method). The alkalized alumina method uses 64% Al2O3 and 21% Na2O to convert the SO2 into Na2SO4. The lime method uses powdered lime or dolomite directly within the hearth. Any of these methods can obtain desulfurization efficiencies greater than 90%. The Institute of Industrial Technology has selected the first two of these methods for study of their applicability to large desulfurization systems, 6000 N cu m/hr for the activated carbon method and 150,000 N cu m/hr for the Mn O method.
APTIC-22180

PROCESSES FOR RECOVERING SULFUR FROM SECONDARY SOURCE MATERIALS.

Bureau of Mines Information Circ., no. 8076, 62p.,
1962. 561 refs.
B. K. Shibler, and M. W. Hovey.
Identifiers: *Hydrogen sulfide, *Manganese dioxide (japanese), Stack gases, Coke, Natural gas, Steam plants, Mining, Paper manufacturing, Petroleum production, Primary metallurgical processing, Alkaline additives, Sulfuric acid, Ammonium compounds, Calcium sulfates, Sulfates.

A bibliography of articles relating to sulfur recovery methods is presented. In addition to general information on sulfur, the material on processing methods is arranged under the six principal sources of secondary sulfur, as follows: volcanic sulfur, including all elemental sulfur deposits not adaptable to the Frasch mining process; hydrogen sulfide as found in sour natural gases, petroleum refinery products, and coke-oven gases; sulfur dioxide from the roasting and smelting of metal sulfide ores and from power plant waste gases; pyrite and pyrrhotite obtained by mining mineral deposits or produced as by-products from the concentration of sulfide ore; gypsum and anhydrite occurring as deposits of calcium sulfate; and industrial wastes containing sulfates, sulfites, and sulfuric acid, such as those produced in the steel, paper, and petroleum industries. Hydrogen sulfide can be utilized for acid making and for conversion to elemental sulfur. Recovery processes for sulfur dioxide include the manganese dioxide and the ammonium sulfate methods. Sulfur from petroleum refining acid wastes can be obtained by regeneration, compounding, or coking processes. (Author summary modified)
APTIC-22809

AUTOMOTIVE AIR POLLUTION CONTROL.

Preprint, Society of Automotive Engineers, Inc.,
New York, 9p., 1970. (Presented at Society of
Automotive Engineering Section Meeting, 1970,
Paper 700248.)
Harry F. Barr.
Identifiers: *Automotive emission control, Toxic tolerances, Headache, Automotive emissions, Engine exhausts, Crankcase emissions, Fuel tank evaporation, Carburetor evaporation losses, Smog, Power sources, Internal combustion engines, Maintenance, Hydrocarbons, Photochemical reactions, Carbon monoxide.

A general outline of the air pollution problem in the United States is presented, with particular emphasis on the contributions made by the internal combustion engine, and reductions obtained in hydrocarbon and carbon monoxide emissions by recent control systems are indicated. Los Angeles, photochemical smog, and emission control for California cars are mentioned in particular. Emissions and their control are indicated in relation to the four emission sources: crankcase, carburetor, fuel tank vent, and exhaust pipe. Ninety-three percent of the national carbon monoxide total is automotive, and 51% of the total air pollution tonnage in the U. S. is carbon monoxide. Health effects set in around 100 ppm where headache and reduced mental acuity occur after several hours of exposure. Alternate powerplants and periodic vehicle maintenance are mentioned, as well as the contribution of the Society of Automotive Engineers to emissions control.
APTIC-23369

PROCESS FOR OBTAINING ELEMENTAL SULFUR FROM SULFUR DIOXIDE OR GASES CONTAINING IT.

(Verfahren zur Gewinnung von elementarem
Schwefel aus Schwefeldioxyd oder solches
enthaltenden Gasen). Text in German.
(Metallgesellschaft A. G., Frankfurt (W.
Germany)) Ger. Pat. 711,509. 4p., Oct. 2, 1941.
(Appl. March 24, 1938, 4 claims).
Conway Frhr. V. Girsewald, Gerhard Roesner,
and Max Wohlwill.
Identifiers: *By-product recovery, *So2 removal (combustion products), Germany, Ashes, Combustion gases, Fly ash, Organic sulfur compounds, Carbon dioxide, Carbon monoxide, Sulfur compounds, Hydrogen sulfide, Catalysts, Reduction.

A process is presented for aftertreatment of sulfur dioxide containing carbon monoxide, carbon oxysulfide, and hydrogen sulfide as impurities, in the presence of a catalyst at 400-800 C to obtain a product that contains only carbon dioxide, water vapor, and sulfur vapor. The aftertreatment is accomplished by recycling the waste gas from the reduction furnace into a chamber connected with the furnace, in which the only catalyst present is fly ash or ashes in the form of granules or briquettes; the walls of this chamber also are built of materials that will have little or no catalytic effect.
APTIC-23385

FLAME GRID AND COMPONENT PARTS THEREOF.

(North American Mfg. Co., Cleveland, Ohio) U.
S. Pat. 3,524,632. 27p., Aug. 18, 1970. 4 refs. (Appl.
June 12, 1968, 67 claims).
Theodore E. Davies.
Identifiers: *Burners, *Incineration, *Firing methods, Evaporators, Furnaces, Combustion.

The invention relates to direct-fired, flame-grid type burners using substantially raw fuel to heat a gaseous stream such as air or gas (carrying or not carrying combustibles, including fumes, to be incinerated). The burners have structures that make them suitable for use in a make-up air heater, air space heater, oven, dryer, evaporator, draw furnace, or fume or combustible incinerator. They can handle temperature rises from 3 to 1500 F. Each burner has a long turn-down range and plate-like portions with flow opening or edge portions for diverting some stream portions into a combustion zone on a flame holder and subsequently mixing the combustion products with all air stream portions for uniform heating or incineration. In addition to having minimum initial and operating costs, the burners meet the highest incineration standards. (Author abstract modified)
APTIC-23819

EXHAUST BACK PRESSURE CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE.

(Ethyl Corp., New York) U. S. Pat. 3,523,418. 5p.,
Aug. 11, 1970. 4 refs. (Appl. Oct. 7, 1968, 3 claims).
Frederick J. Marsee.
Identifiers: *Back pressure, *Throttling, *Engine exhausts, *Control methods, *Hydrocarbons, Internal combustion engines.

Among systems for controlling exhaust back pressure in internal combustion engines, one is responsive principally to the heat of the exhaust and is operative only while the engine is warming up. Another system is responsive to manifold vacuum and is operative while the engine is idling or operating under a particularly small load. The latter system will not operate without a mechanical linkage to the engine accelerator. If the linkage breaks down, the vacuum control units holds the back pressure throttline element closed and thus results in engine stalling. The present invention provides a device that is responsive to back pressure and is controlled directly by the engine; no mechanical linkage is required. The throttling element is placed in the exhaust pipe and is controlled by a vacuum operator unit, which in turn is modulated by a sensing unit responsive to both the engine vacuum and exhaust back pressure. The sensing element provides a vacuum signal to the vacuum operator unit to control the throttline element during lower-power engine operation. There is no danger that exhaust gas flow will be throttled at high-power engine operation, since the velocity of the gases coupled with a spring operator is sufficient to overcome any vacuum signal from the engine. In a preferred embodiment, no throttling of the exhaust gas occurs at idle. The system also effects a reduction in unburned hydrocarbons. Emission reduction figures are given for standard V8 engines.
APTIC-23821

RECOVERY OF SULPHUR.

(Assignee not given.) U. S. Pat. 1,917,687. 5p.,
July 11, 1933. (Appl. Sept. 8, 1930, 10 claims).
Raymond F. Bacon, and Henry T. Hotchkiss Jr.
Identifiers: *By-product recovery, *So2 removal (combustion products), *Sulfur compounds, Stack gases, Primary metallurgical processing, Operating variables, Design criteria, Reduction, Fluid flow, Temperature.

A process is provided which will reduce the sulfur dioxide from the smelting of pyritic and other sulfide ores to elemental sulfur, and at the same time protect against any subsequent oxidation the sulfur so formed. The reducing gas is introduced at a point in the charge above the combustion zone but materially below the top of the charge. By introducing it above the point where the pyrrhotite form melts, the gas will not only flow through the charge more freely because of the relative porosity of the material above the melting zone as compared with points below, but it will also be introduced at a point in sufficiently close proximity to the focus to take advantage of the very high temperature, to initiate the rapid reaction with the hot SO2. This reducing gas may be producer gas, water gas, natural gas, atomized petroleum or other suitable fluid reagent which will reduce the SO2 with the liberation of substantial amounts of heat.
APTIC-24576

A NEW DRY PROCESS OF SO2 REMOVAL FROM FLUE GAS.

Proc. World Petrol. Congr., 7th, 1967, p. 289-295. 3
refs. (May 1967.)
Tsukumo Uno, Hiroshi Yamada, Masao Higashi,
Saburo Fukui, and Masumi Atsukawa.
Identifiers: *By-product recovery, *Manganese dioxide (japanese), Costs, Japan, Stack gases, Electric power production, Electrostatic precipitators, Ammonium compounds, Manganese compounds, Sulfates.

A new dry process for removing sulfur dioxide from power-plant flue gases entails contacting the gases with powdered, activated manganese oxides in a fluidized or moving bed absorber. The resulting manganese sulfate and excess of unreacted absorbent are collected in a mechanical separator and electrostatic precipitator installed in series. The greater part of the collected absorbent is returned to the absorber as recycle solids; the remainder is regenerated, and ammonium sulfate is recovered as a by-product. In the regeneration process, the slurry containing manganese sulfate solution and unspent absorbent is first contacted with ammonia-containing air and then delivered to an oxidation tower equipped with an air atomizer, where manganese sulfate is oxidized to activated manganese oxide. Excess ammonia is fed to the tower. When tested in a pilot plant treating 3000 cu Nm/hr of flue gas, the efficiency of the process for SO2 removal was greater than 90%. Capital costs of the process for a 1000 MW oil-burning plant are estimated at $15,500,000, and net operating costs at 0.23 to approximately 0.20 mills/KWhr.
APTIC-24589

IMPROVEMENTS IN RECOVERY OF SULPHUR DIOXIDE FROM GASES.

(Assignee not given.) Brit. Pat. 479,630. 3p., Feb. 9, 1938. (Appl. Dec. 24, 1936, 3 claims).
Raymond Foss Bacon.
Identifiers: *Solubility, *Absorption (general), *Organic acids, Stack gases, Primary metallurgical processing, Reaction mechanisms.

When alkali-metal salts of water-soluble organic acids are used to recover sulfur dioxide from roaster gases, the amount of acid displaced increases in concentration as the absorption proceeds, resulting in quick attainment of equilibrium and a consequent reduced absorption value. In contrast, the solubility of the displaced acid in aqueous solutions of salts of relatively water-insoluble weak acids is small. As the absorption proceeds, the concentration of the weak acid in solution does not appreciably increase, and the tendency for reversed reaction remains at a low value. This results in substantially complete conversion of the salt to sulfite and bisulfite. At the end of the absorption operation, two phases exist in the absorption medium: a liquid phase and a solid phase made up entirely of the displaced acid. When the absorption medium is heated, e.g., to about 100 C, the solubility of the displaced acid increases and the solid phase passes substantially into solution, thus giving a relatively high concentration of acids in solution and causing the rapid evolution of sulfur dioxide, which can be utilized directly or cooled and compressed to its liquid form. Suitable acids are sulfanilic, benzoic, fumaric, phthalic, and salicylic. All have solubilities lower than 1.1 gr per 100 gr water at 20-25 C.
APTIC-24591

RECENT PROCESSES FOR THE REMOVAL OF SULFUR COMPOUNDS FROM GASES, AS SEEN IN GERMAN PATENTS FOR THE YEAR 1964.

(Neuere Verfahren zur Entfernung von Schwefelverbindungen aus Gasen--dargestellt an Hand deutscher Patent von 1964). Text in German.
Gas Wasserfach (Munich), 106 (31):857-859, Aug. 6, 1965. 19 refs.
Fritz Rosendahl.
Identifiers: *Control methods, *So2 removal (combustion products), Germany, Combustion gases, Scrubbers, By-product recovery, Absorption (general), Alkaline additives, Sulfuric acid, Alcohols, Ammonia, Iron compounds, Amides, Organic sulfur compounds, Carbon monoxide, Sulfur compounds, Hydrogen sulfide.

German patent literature is reviewed, summarizing achievements in the field of dry gas removal, wet ammonia processes and other wet processes, reactions between hydrogen sulfide and sulfur dioxide, and the removal of organic sulfur compounds. An iron oxide is obtained from the roasting of pyrite, the fine granular form of which can absorb 93.3% S. One ammonia process, making use of waste water from a coke plant, gives a 70-80% sulfuric acid yield. Wet processes use not only water but also various organic solvents such as methanol, pyrrolidone, or piperidone. The advantage of the two last-mentioned solvents is their relatively high boiling point. Acetone, methanol, or ethanol can also be added to the water used in scrubbers (5-20 vol. %), reducing the viscosity and making possible a lower operating temperature. Hydrogen sulfide and carbon monoxide can be removed from waste gases under pressure by using various esters and ester mixtures. The removal of organic sulfur compounds can be achieved with an efficiency of at least 90%. The removal of hydrogen sulfide from gases by the use of activated charcoal requires a pore diameter of more than 60 A, while the removal of organic sulfur compounds requires a diameter on the order of 20-40 A.
APTIC-24594

PROCESS FOR RECOVERING ELEMENTAL SULFUR FROM GASES CONTAINING SULFUR DIOXIDE.

(Procede pour retirer du soufre elementaire de gaz contenant de l'anhydride sulfureux). Text in French. (Metallgesellschaft A. G., Frankfort (West Germany)) French Pat. 784,942. 3p., July 29, 1935. (Appl. Jan. 30, 1935, 6 claims).
Personal Author Not Recorded.
Identifiers: *By-product recovery, *So2 removal (combustion products), *Reduction, Germany, Combustion gases, Electrostatic precipitators, Amines.

The process is especially designed for use with gas mixtures containing trace amounts of sulfur dioxide. The sulfur dioxide is first recovered from the gas mixture by treating this mixture with a mixture of organic bases such as xylidine with water in the presence of substances promoting the decomposition of any poorly soluble sulfates of these bases that might be formed by secondary reactions. The SO2 is expelled from this solution by the application of heat, and is then passed over a carbonized reducing agent at a temperature in the range 800-1200 C. The gas obtained from this reduction process is submitted to an additional treatment with catalysts at temperatures in the range of 400-700 C, so as to destroy any sulfurated products it might contain. This purified SO2 gas is then treated to obtain the precipitation of elemental sulfur, as for example, by the use of a high-voltage electrostatic field.
APTIC-24599

VENTILATION AT NON-FERROUS MELTING AND POURING OPERATIONS.

Am. Foundryman, 22 (4):125-131, April 1952.
(Presented at the American Foundrymen's Society Annual Meeting, 56th, Atlantic City, N. J., May 1-7, 1952, Paper 52-68.)
Herbert J. Weber.
Identifiers: *Fumes, *Metal fabricating and finishing, *Ventilation, Occupational health, Furnaces, Particle size, Baffles, Exhaust systems, Process modification, Lead compounds, Oxides.

In nonferrous foundries, melting and pouring operations are more hazardous to workmen than machine or cleaning operations for two reasons. First, the particle size of lead fume (one-half micron or less) is too small to be strained out by the filtering action of the respiratory tract. Secondly, the fume is evolved as lead oxide which is very soluble in body fluids. These facts indicate that a program of hygienic control should begin with the ventilation of melting and pouring bays. By considering ventilation an air control problem rather than a fume problem, one foundry achieved effective and simple remedies. The charging floor of the furnace was walled off from the furnace bay to prevent convective air currents from carrying fumes to the bay. The hot convective gases issuing from the furnaces are controlled by baffling them upward above the breathing level to gravity stacks. Fresh outside air is introduced to serve as a convector and dilutent for those fumes escaping the hoods or rising from ladles during skimming and pour off. Areas outside the bay are protected by keeping the bay under vacuum by means of overhead exhaust ventilators. Where the need for overhead cranes for removing crucibles from furnaces precludes the use for local exhaust hoods, ventilation is achieved by grate-covered air tunnels in the floor directly in front of the furnaces. Outside air is introduced into the tunnels and is uniformly delivered through the interstices of the grating. The effect is an air current at the breathing level of the workmen.
APTIC-24607

METHOD FOR THE SEPARATION OF PYRITE FROM COAL.

(Verfahren zur abscheidung von Pyrit aus Kohle).
Rept. 41/69, 19p., 1969. 7 refs. Translated from German. Belov and Associates, Denver, Colo., 23p., Feb. 23, 1970.
Personal Author Not Recorded.
Identifiers: *Coal preparation, Costs, Germany, Coal, Electric power production, Particle size, Centrifugal separators, Gravity settling, Laundering (coal), Iron compounds, Sulfides.

Investigations of untreated coal which were conducted in different countries indicate that the pyrite percentage of the total sulfur content of coal is so high that mechanical separation could result in a significant reduction of the sulfur content. Separation is technically possible and economically feasible as pyrite occurs at an average of 80-90% in a particle size larger than 20 micron. Wet methods (gravity and centrifugal separation, gravity turbidity methods, and flotation) should have preference because of their operational and throughput efficiency. In connection with the trend towards the hydro-mechanical production of coal, direct burning of mud in power stations is discussed. The use of atomic heat is being contemplated to reduce the cost of drying. The selection of installations for sulfur removal is discussed according to the particle size region of interest. If the sulfur content of the initial coal can be reduced by at least 30-40%, and if the operational costs of the sulfur removal amounts to approximately 5 to 35 cents per ton product, then it is profitable to provide mechanical pyrite separation methods. (Author conslusions modified)
APTIC-24609

INVESTIGATIONS ON THE REDUCTION OF THE SULFUR CONTENT OF COKE DURING CARBONIZATION.

In: Report of Bituminous Research Activities.
Proj. M-25-B 392-B-9, p. 12-29, 1956. 17 refs.
Personal Author Not Recorded.
Identifiers: *Coke, *Coal preparation, Quenching, Carbonates, Chlorides, Aluminum compounds, Boron compounds, Calcium compounds, Sodium compounds, Sodium carbonate, Pyrolysis.

A study is reported of attempts to reduce the sulfur content of cokes during carbonization. A literature search yielded nothing of economic value. Laboratory experiments using 3% additions of calcium carbonate and sodium carbonate to the coal prior to coking yielded cokes with an increased sulfur content. These did, however, indicate that the quenching method was in some way connected with the final sulfur content; a series of quenching tests confirmed this, but the methodology yielded only insignificant differences. Further investigation in this area is recommended. Tests with 1% additions of aluminum chloride and sodium borate produced cokes of slightly lower sulfur content with the AlCl3, providing the greater reduction. Most of the reduction in these tests was in the form of organic sulfur; the inorganic sulfur content remained essentially unchanged. In an effort to reduce sulfur determination time (12 hours using Eschka method), a preliminary study of sulfur determination using x-ray fluorescence was undertaken with promising early results.
APTIC-24610

EXPERIENCES WITH THE USE OF LIME IN FLUE GAS DESULFURIZATION.

AB Cementa, Malmoe, Sweden, 39p., 1970. 43 refs.
R. Bernhoff.
Identifiers: *Alkaline additives, Costs, Sweden, Stack gases, Boilers, Steam plants, Solid waste disposal, Particle size, Scrubbers, By-product recovery, Calcium sulfates, Manganese sulfates, Temperature.

Several limestone addition methods of controlling sulfur dioxide are discussed. There are two types of such processes- wet and dry. In the wet process a slurry of lime is introduced directly into a scrubber. The SO2 reacts to form calcium sulfite or sulfate. In the dry process, pulverized limestone is blown directly into the boiler, where it reacts to form calcium or magnesium sulfite or sulfate. The dry process is only about 50% efficient, so it is used primarily with low sulfur fuels. The general term limestone covers a range of compounds containing calcium and magnesium. Most tests show that dolomitic limestone is not as effective as high calcium limestone. The sorption rates of various limestones vary, depending on particle size, precalcination, temperature, point of injection, and stoichiometry. Several operating power plants which have limestone control processes are described, including two plants in the U. S. and one in Sweden. Cost studies of the operations are given, including the cost of solid waste disposal and potential recovery methods.
APTIC-24613

EVALUATION OF THE PROCESS OF OBTAINING AROMATIC HYDROCARBONS FROM COKE-OVEN GAS.

(Otsenka protsessa polucheniya benzol'nykh uglevodorodov iz koksovogo gaza). Text in Russian. Koks i Khim., no. 6:38-40, 1970. 6 refs.
V. M. Kagasov, Yu. G. Yefremov, O. P. Klebnikov, D. D. Zykov, and V. P. Maykov.
Identifiers: *Coke oven gas, *Absorption, *Benzenes, Ussr, Stack gases, Coke, Fuel gases, Pilot plants, Chromatography, Spectrophotometry, By-product recovery, Toluenes, Xylenes, Flow rates.

A pilot study of the extraction of benzene from coke-oven gas is evaluated in terms of rate of recovery of benzene and other hydrocarbons, loss of absorbing oil, and power (steam) consumption. Waste gas flow rate was 90 thousand cu m/h with a raw benzene content of 35.8 g/cu m. Chromatographic analysis showed benzene, toluene, and xylene to comprise 98-99% of the hydrocarbons recovered. The use of chromatrographic and spectrophotometric studies is recommended in the evaluation of such recovery operations.
APTIC-24620

A PARTIAL POLLUTION SOLUTION: PLANT TREES.

Lasca Leaves, vol. 19:35-36, June 1970. 1 ref.
George P. Hanson, and Linda Thorne.
Identifiers: *Leaves, *Absorption, *Ozone, Plants (botany), Flowers, Petunias, Trees, Smog, Control methods.

The use of plants capable of absorbing significant quantities of smog while maintaining relatively normal life processes is briefly discussed as a means of trapping and thus reducing smog levels. Preliminary test chamber data indicate that petunias are very efficient ozone absorbers, bougainvillea is intermediate, and camellias absorb only very small quantities. Observations of leaf stomates and their guard cells show that if ozone concentrations are kept relatively low, most of the stomates remain open and ozone is trapped; thus, to effectively use plants' smog-trapping capability, an appropriate environment must be provided. A tree and shrub landscaping plan is suggested for such areas as homes, playgrounds, and picnic areas to reduce smog levels in those areas to relatively harmless levels.
APTIC-24622

EVAPORATIVE EMISSIONS CONTROLS IMPROVED IN '71 MODELS.

Automotive Ind., 143 (8):60-62, Oct. 15, 1970.
Personal Author Not Recorded.
Identifiers: *Fuel tank evaporation, *Automotive emission control, California, Gasolines, Automobiles, Engine operation modification, Engine design modification.

An approved system of controlling escape of fuel tank vapors to the atmosphere is required on all 1971 automobile models. Essentially, the system on 1971 models is that required for cars in California in the previous model year. There are, however, some noteworthy improvements and refinements. Specific elements of the American Motors Corp. evaporative control system include a fuel expansion tank, closed fuel tank vent system, fuel check valve, and pressure and vacuum relief filler cap. The Chrysler 'vapor saver' evaporation control system is virtually the same as for 1970 California models, except for some detail changes in some models. In general, the Chrysler system uses the engine crankcase for vapor storage. Ford's system utilizes a carbon canister for storage of excess vapors. Also, it features a metering orifice as part of the liquid vapor separator. In the General Motors system, the canister design and canister purging system used last year has been simplified. This complete system uses a sealed tank with an ingenious top baffle, extended filler neck and air-line that prevent fuel blow-back on filling.
APTIC-24625

PRODUCTION OF SULFUR TRIOXIDE AND SULFURIC ACID.

(Metallgesellschaft A. G., Frankfurt (W. Germany)) U. S. Pat. 3,525,586. 7p., Aug. 25, 1970. (Appl. Oct. 12, 1966, 4 claims).
Herbert Drechsel, Karl-Heinz Doerr, and Hugo Grim.
Identifiers: *By-product recovery, *Catalytic oxidation, *Absorption (general), Germany, Stack gases, Sulfuric acid, Sulfur trioxide, Heat transfer.

A catalytic oxidation process is described which utilizes sulfur dioxide-containing gases to produce sulfur trioxide and sulfuric acid. The SO2 content of the gas must be at least 9% in order for this process to work. The process involves a series of heat exchange and oxidation steps and a hot single stage intermediate absorption step. It is self-sufficient as to sensible heat requirements, actually producing recoverable excess heat to be utilized for other purposes. The advantages of this process over previous ones are that the initial concentration of SO2 in the starting gas can vary over a specified range, and that this process produces excess heat while other processes require heat inputs to function properly. This process results in a high degree of conversion, making it economically desirable.
APTIC-24628

FACTORS INFLUENCING THE EFFICIENT OPERATION OF ELECTROSTATIC PRECIPITATORS FOR PULVERISED-FUEL ASH.

Australian Chem. Process. Eng. (Sydney), 23 (9):18-19, 21-23, 25, 27, Sept. 1970. 15 refs. (Presented at the Clean Air Conference, 1968.)
R. A. Durie, and E. C. Potter.
Identifiers: *Fly ash, *Operating variables, *Electrostatic precipitators, Australia, Coal, Electric power production, Particle size, Density.

Fly-ash from bituminous Australian coals are difficult for power plants to precipitate at the desired efficiency of 99.9% or more. Practical precipitation technology has to recognize an interplay of fly-ash precipitation and dislodgement in plant design and operation It is now almost always necessary to induce the dislodgement of collected fly-ash by rapping or vibrating collector plates mechanically, and this deliberate dislodgement of the fly-ash layer is inevitably accompanied by a re-entrainment of loose outside particles. The release of a large quantity of such particles following simultaneously rapping of many collector plates can place a sudden and unmanageable burden on subsequent collector plates. If the differentials of cohesive strength through the thickness of the growing fly-ash deposits can be controlled, there arises some opportunity to perfect the technique of dust-dislodgement. In this connection, it is possible that electrolytic conductors advocated as additives for improving precipitator efficiency raise the cohesive strength of the fly-ash to levels that inhibit entrainment. On the other hand, cohesive strength also depends on particle size, size distribution, and packing density. A beneficial combination of these variables may cancel any electrical difficulties that smaller particles experience in being precipitated.
APTIC-24630

AIR POLLUTION BY GAS TURBINES -- IS CONTROL POSSIBLE"

Can. Aeron. Space J., 16 (8):339-344, Oct. 1970. 15 refs. (Presented at the Canadian Aeronautics and Space Institute Annual General Meeting, Ottawa, May 19, 1970.)
J. Odgers.
Identifiers: *Engine exhausts, *Gas turbines, *Combustion, Canada, Control methods, Engine design modification, Design criteria, Carbon monoxide, Nitrogen oxides.

The major pollutants found in gas turbine exhaust are discussed in terms of equilibrium products and nonequilibrium products. Because they are independent of the route of reaction and only derived from the end products, the equilibrium compounds have a 'right' to be in the exhaust. By contrast, nonequilibrium compounds are those substances that are produced as intermediates during the combustion process and which have been 'frozen' so that they cannot react further. These compounds result from inefficient combustor design; they have no 'right' to be in the exhaust. There is no theoretical reason why the nonequilibrium compounds carbon (smoke) and hydrocarbons cannot be eliminated by improvements in engineering design. Carbon monoxide, because of its rapid rate of decomposition, should also be capable of being reduced in quantity. Nitrogen oxides present a much more difficult problem because of their extreme dependence on temperature as a rate-controlling factor. The main solution to this form of pollution lies in preventing its formation rather than trying to reduce the content after formation. If complete control of pollutants is required, there will have to be radical changes in the design of combustors. In particular there is a requirement for a chamber operating with a weak mixture in the primary zone at all engine conditions.
APTIC-24631

METHOD OF ELIMINATING SULFUR COMPOUNDS FROM OIL WITH THE USE OF MICROBES.

(Biseibutsu ni yoru sekiyu chu no iou kagobutsu no jokyoho). Text in Japanese. (Electric Power Industry, Tokyo (Japan), Central Research Inst.) Japan. Pat. Sho 45-20176. 5p., July 9, 1970. 2 refs. (Appl. Oct. 6, 1966, claims not given).
K. Yamada, T. Minoda, S. Nakaya, K. Kodama, and T. Akazaki.
Identifiers: *Desulfurization of fuels, *Microorganisms, *Organic sulfur compounds, Japan, Fuel oil.

A device to let the microbe pseudomonas jianii (contact) oil to change sulfur compounds in the oil into water soluble organic sulfur compounds which will then be eliminated is described. Wide scale screening was conducted to seek the most effective microbe, and pseudomonas jianii was separated from the culture. Under the microscope, the microbe is bacilus, flagella, mobile, and negative gram dye. It is a round agar colony (substitute broth), with raised edge, smooth lustrous surface, whitish pale yellow-brown in color, butter-like, and slightly viscose. It exhibits negative gelatine

liquefication, (slow coagulation with weak acids,) B. C. P. mild, positive nitrate reduction, negative nitric acid respiration, positive hydrogen sulfide formation, negative Indole formation, negative starch hydrolysis, negative acetyl-methyl-carbinol formation, aerobic acid and gas formation, and so on. From these characteristics, it was thought to belong to pseudomonas, closest to pseudomonas fragi. However, due to the difference between p. fragi and the new discovery, the latter was named p. jianii. One test example cited gives a 3.1% desulfurization rate, when a phosphoric acid iodine kalium 0.05%, magnesium chloride 0.02%, meat extract 0.2%, mixture is made with distilled water, at pH 7.0. Adding 5 ml pseudomonas jianii to a 500 ml flask which contains 45 ml of culture and 5 ml crude oil, the flask is shaken 220 rev/min at 28 C for 7 days. Increased sulfur in the culture liquid showed that the desulfurization rate was 3.1%.
APTIC-24641

DESIGN CHARACTERISTICS AND TEST RESULTS OF A NEW MULTICELL FILTER.

(Konstruktionsmerkmale und Versuchsergebnisse
eines neuentwickelten Vielzellenfilters). Text in
German. Wasser Luft Betrieb, 14 (9):358-360,
Sept. 1970.
Otto Knapp, and Hans Luettger.
Identifiers: *Centrifugal separators, *Design criteria, Germany, Dusts, Boilers, Coal, Filters, Combustion air, Flow rates.

In order to stay within limits of the maximum permissible dust emission in the case of a Vekos-Powermaster boiler, a dust extractor was developed characterized by a filter housing with a comparatively large number of cells in the filter housing and by a strictly tangetial direction of the raw gas flow with relatively small velocity (9.5 m/sec). The cells are small diameter cyclones with the flue dust being returned to the furnace. The combustion air purified by this filtering arrangement contained dust levels of between 140 and 236 mg/ N cu m when bituminous coal was used as fuel. The construction has unusually low resistance because of the unhindered inflow of the gas into the cyclones and because of the low gas velocity. The arrangement was tested on a boiler with a mechanical firing mechanism of 80% efficiency, fired with bituminous coal nut size 3 and 4, an ash content of 3.7%, and a 3.1% H_2O content. The raw gas dust content was 0.882 g/ cu m; the purified dust gas content, 0.074 g/ cu m; and the efficiency of the cyclone dust arrester battery, 91.65%.
APTIC-24642

DISPOSAL METHOD FOR SULFUROUS ACID CONTAINED IN WASTE GAS.

(Haigasuchu no aryusangasu shoriho). Text in
Japanese. (Toa Gosei Chemical Industry Co.
(Japan)) Japan. Pat. Sho 22-528. 2p., June 8, 1948.
(Appl. Dec. 12, 1943, claims not given).
K. Furuto.
Identifiers: *Sulfurous acid, *Coal, *Adsorption, Japan, Stack gases, Dusts, Chemical processing, Inorganic acids, Sulfur compounds, Oxidation, Water.

Waste gases emitted by sulfur manufacturing plants contain relatively large amounts of sulfurous acid. To remove the acid, such waste gases are conventionally treated with ammonia solution or flowers of zinc. Disposal costs are high for both methods. Since sulfurous acid gas is water soluble, another suggested method is to remove it by washing the waste gas with water in combination with certain chemicals. But again, this method is not economical because it needs a tremendous amount of water. The invention described provides new disposal method in which waste gas containing sulfurous acid is washed with water mixed with coal dust obtained from a plant manufacturing producer gas from coalite or coal. The carbonic content of coal dust possesses adsorptive as well as contact oxidation powers with respect to sulfurous acid; the ash content can neutralize sulfurous acid. Utilization of the dust is an inexpensive solution to the problem of removing sulfurous acid from waste gas.
APTIC-24643

A NOVEL PROCESS FOR NEUTRALIZING AN ALKALINE WASTE WATER AND FOR DESULFURIZING SMOKE.

(Arukari haisui no chuwa to haien datsuryu no
atarashi hoho). Text in Japanese. Kogai to Taisaku
(J. Pollution Control), 6 (10):825-827, Oct. 15,
1970.
Ryoji Muraki.
Identifiers: *Bubble towers, *Absorption (general), *Ph, Japan, Stack gases, Smokes, Boilers, Dye manufacturing, Sewage treatment, Carbon dioxide.

A bubble-contact absorber was developed for simultaneously desulfurizing boiler smoke and neutralizing alkaline waste water. The boiler described uses heavy oil and generates 7.48% carbon dioxide and 0.2% sulfur dioxide. The waste water of the dyeing factory contains large amounts of caustic soda that can be neutralized by sulfur dioxide. The alkaline waste water is neutralized to a pH of 9 by the first step of the reaction and to a pH of 4.7 by the second. However, the standard for waste water is pH 5.6-8.6 so the reaction of the second step must be advanced. Application of the process is difficult because the quantities of sulfur dioxide and waste water are not constant. If the amount of alkalies greatly exceeds the sulfur dioxide, carbon monoxide is added to the gas. Addition of a strong acid like sulfuric acid to the water for the pH Control is not effective, since, for example, the sulfate radical is consumed by the substitution of salts by sulfur dioxide. In the absorber, bubbles of carbon dioxide contact the alkalies: the water is neutralized to a pH of 9 by the carbon dioxide and to a pH of 6.8 by the production of carbonic acid. The pH value then remains a constant 6.8, since the carbon dioxide does not react at this degree of acidity. The apparatus effectively utilizes the surplus sulfur dioxide gas, in which case caustic soda is usually added. The relationship between the amount of smoke and that of alkali to be neutralized is shown in a diagram. The bubbles formed in the apparatus is very fine and present in large quantities.
APTIC-24645

WASTE GYPSUM INTO USEFUL PRODUCTS.

Chem. Process. (Chicago), 16 (1):18-19, Jan. 1970.
Personal Author Not Recorded.
Identifiers: *Gypsum, *By-product recovery, *Ammonium compounds, *Sulfates, Mineral products, Fertilizer manufacturing, Mineral processing, Ammonia, Carbonates, Calcium compounds, Carbon dioxide.

A process was developed in Amsterdam whereby gaseous ammonia and carbon dioxide are directly introduced into a circulating gypsum slurry for conversion to ammonium sulfate and calcium carbonate. The reactor is a tall cylindrical vessel containing an upward flowing slurry of unconverted gypsum, calcium carbonate, ammonium carbonate, and ammonium sulfate; the slurry is circulated, during which time the heat of reaction is removed and gaseous ammonia and carbon dioxide are introduced into the circulation loop. Gypsum is slurried with muddy filtrate from the chalk filter and introduced into the reactor before the loop. Introduction of the gases occurs by means of specially developed mixing chambers. Calcium carbonate is separated from the ammonium sulfate by filtration on a rotating filter. The last filtrate portion is fed to the slurry preparation tank, where it is mixed with dry gypsum to yield a slurry of the right concentration. The remaining part of the filtrate is pumped to the battery limits of the plant where it can be further processed into ammonium sulfate crystals or used in a complex fertilizer plant with nitric oxide attack of the calcium phosphate rock. Production and consumption figures of the process, per ton of pure ammonium sulfate, are presented.
APTIC-24646

TRENDS OF CLEANING SUPPLY AND EXHAUST AIR IN PROCESS ENGINEERING.

(Tendenzen der Zu- und Abluft-Reinigung in der
Verfahrens-Technik). Text in German. Wasser
Luft Betrieb, 14 (6):241-242, June 1970.
Peter Staubing.
Identifiers: *Operating variables, *Particle size, *Electrostatic precipitators, Germany, Particulates, Dusts, Suspended particulates, Photometric methods, Particulate sampling, Membrane filters, Filters.

The purity requirements of intake air in process engineering are determined by the size of the dust particle which is too large to be acceptable and is dictated by product quality considerations. In such enterprises, the separation of fine and of finest dust and of suspended particles is mandatory. A particular property of dust particles (reactivity, settling velocity) is measured by optical methods and by filtering to determine particle size which is then expressed in terms of equivalent diameter. Air filters are classified by the smallest particle size they will filter. The most inexpensive are disposable filters; the trend is towards automatic air filters. Fully automatic air filters (electrofilters) are practicable only rarely. The operation of an air filter installation must be constantly supervised by electro-optical or by electro-acoustic instruments, with the supervision of the pressure difference increase with increasing dust accumulation being the paramount consideration. In Electric air filters, dust saturation cannot be measured mechanically and must be judged from experience. A special problem presents dust removal of brown converter smoke generated by air blasting for which an electrostatic dust removal method has been developed which cleans exhaust gases at 400 to 500 C. No ionization occurs as in electrofilters but only a coagulation of particles in an electrostatic field.
APTIC-24654

MANUFACTURING METHOD OF ACTIVATED CHARCOAL.

(Kasseitan no seizoho). Text in Japanese. (Takeda
Yakuhin Kogyo Co. (Japan)) Japan. Pat. Sho 45-
24645. 5p., Aug. 17, 1970. 1 ref. (Appl. Dec. 6,
1965, claims not given).
Y. Shirai, H. Ichikawa, A. Yoshida, N. Uchida,
and Y. Tsuji.
Identifiers: *Charcoal, *Chemical processing, *Adsorption, Japan, Stack gases, Kilns, Particle size, Carbides, Chlorides, Zinc compounds, Temperature.

A new method for the production of activated charcoal assures continuous manufacturing of a uniform-quality product from wood flour through chemical activating means. The method avoids the discharge of poisonous gas, generally without an additional arrestor of such gas or with one of smaller size when it is necessary. In conventional manufacturing processes using a rotary kiln, carbonated wood flour becomes highly viscous at some stages of the process and sticks to the inner wall of the kiln to form so-called 'ring'. This makes it impossible to give uniform burning and produces a product of too big a size, the inner portion of which is not sufficiently activated. Also, because of low heating efficiency of the kiln, heating of around 1000 C is required; the temperature of 500-700 C is otherwise sufficient for the required heating. Furthermore, such overheating of hot gas in the kiln inevitably makes the activating agent more volatile, causing most of it to discharge with hot gas out of the equipment. As a result, it causes a problem of air pollution with zinc chloride, an activating agent used for the manufacture of activated charcoal. The new method is devised to eliminate the defects noted above. It requires no activating agent gas collector, or a small one when needed. In the system, a non-viscous carbide product of pre-carbonated wood flour is moved on by hot gas. While stirring it uniformly, a mixture of material wood flour and activating agent is put into the now flowing carbide. The mixture becomes

carbonated very rapidly in the non-viscous carbide which is stirred and heated by a host gas. The product comes in uniformly small grains of 5mm or smaller in diameter. The activating agent under this manufacturing system is led to the carbide being stirred for the carbonation process where the temperature is usually 350 C or lower, so that the agent gets aggregated in the carbide layer and will not get discharged with hot gas.
APTIC-24672

DISPOSAL OF WASTE GAS CONTAINING DILUTE SULFUR OXIDE.

(Kihaku sanka iou ganyu gasu no kaisho). Text in Japanese. Kogyo Kagaku Zasshi (J. Chem. Soc. Japan), 73 (7):1731-1732, July 5, 1970. 3 refs.
Toyoshi Asano.
Identifiers: *By-product recovery, *Absorption (general), Japan, Stack gases, Petroleum refining, Electric power production, Primary metallurgical processing, Scrubbers, Sulfuric acid, Manganese compounds, Oxides, Reduction, Density.

Disposal of sulfur dioxide in pyrites roasting, petrochemical industry, or power plant waste gas is discussed. In a conventional wet disposal method, SO2 is merely neutralized by an agent like lime or ammonia, but a very large quantity of the neutralization agent is needed. Another disadvantage of the conventional method is that its sulfur oxide absorption efficiency drops with substances formed as a result of the neutralization process. When SO2 gas was made to flow countercurrent to manganese ore suspension in a tower, SO2 was reduced to sulfuric acid of a density about the same as that obtained in a lead chamber method, and practically no SO2 was contained in the gas discharged from the tower. A 10% manganese-ore suspension was used in an experimental device in which the suspension was heated to the desired temperatures and, when vaporized by the heating, automatically reduced from gas to liquid. Ore composed of Mn (27.96%), SiO2 (37.32%), Fe (8.16%) and P (0.03%) was pulverized to 80-mesh grains and mixed with water at a 10:90 ratio to make the suspension used as the absorbing agent. From the results of this test, it was determined that the higher temperature of the suspension, the higher its SO2 absorption efficiency; the amount of SO2 absorbed decreased with increasing sulfuric acid density in the suspension; at 50 C, the quantity of sulfuric acid contained in the suspension reached 74.3 g/100 ml. The contact time of SO2 gas with the suspension was 5.7 sec and the gas injection speed 8 cm/min. The device maintained about 100% SO2 absorption efficiency for 20 hrs, indicating that the manganese oxide suspension can be effectively used as an SO2 absorbing agent.
APTIC-24673

GERMAN FOUNDRY EXPERIENCE IN CUPOLA DUST EMISSION AND EMISSION CONTROL.

Mod. Casting, 58 (6):287-292, Dec. 1970. 6 refs.
G. Engels.
Identifiers: *Dusts, *Cupolas, *Control equipment, Germany, Coke, Metal fabricating and finishing, Operating variables, Particle size, Collectors, Centrifugal separators, Electrostatic precipitators, Venturi scrubbers, Secondary air, Sodimentation, Density, Ph.

The most important factors in the selection of a cupola dust removal system are volume of gas to be cleaned, its temperature, its dust content, particle size distribution, chemical constituents present, and density of the dust particles. To obtain a representative survey of the ranges of cupola emission and the relationship of emission rate to operating variables, careful measurements were made of 35 industrial installations. The most important finding of the survey was that the statistical average for dust content of cupola top gas was practically the same for both cold blast and hot blast cupolas. The dust content of cupola top gas increases with coke rate and the percentage of steel scrap in the charge; the content of coarse dust increases with blast rate and the amount of adherent sand on the metallics charged; the required efficiency of the collector increases with the dust concentration in the top gas, and efficiency is often strongly dependent upon particle size distribution. Also, all wet-type collectors require devices for cleaning the circulating water and for adjusting its pH value. The method of exhausting gases from the cupola should minimize the intake of additional outside air. There is a basic difference in the makeup of waste gases exhausted above the charging door and top gases exhausted below the charging door. Deposits of certain materials in the gas piping often creates ignition hazards. Intake of secondary air and the consequent uncontrolled afterburning can be prevented by drawing off top gases at a pressure which is in equilibrium with flow resistance in the stack above the suction outlet. The trend in German foundries is toward more simple equipment of high security rather than to the more complex units of theoretically lower operating cost.
APTIC-24674

THE NEW 'HOT' ELECTROSTATIC PRECIPITATOR.

Combustion, 42 (4): 50-53, Oct. 1970.
William G. Henke.
Identifiers: *Electrostatic precipitators, *Temperature, Fly ash, Boilers, Fuels, Coal, Fuel oils, Pulverized fuels, Operating variables, Sulfur oxides control, Sulfur compounds.

The problems associated with low-sulfur fuel are causing increased interest in the 'hot' electrostatic precipitator which, among its features, includes insensitivity to the sulfur content of the gases it cleans. By being located ahead of rather than downstream of the air heaters, the fly ash hot precipitator operates in the range of 500 to 700 F. However, the volume of gas at 600 F is nearly 40% greater than that of the same weight of gas at 300 F, and the higher cost of the hot precipitator is principally a matter of size. Low sulfur problems are caused by the fact that good electrostatic precipitator performance can only be obtained within a relatively narrow range of fly ash resistivity, roughly from 10 to the 8th power to 10 to the 10th power ohm-cm. Further details are considered of low sulfur problems, as well as problem solutions. One approach is enhancement of surface conductivity, but the more attractive alternative is to end dependence on surface conductivity with a high operating temperature. Oil ash is much more of a mobility problem whan fly ash, but at the temperature at which it leaves this hot precipitator, no problems have been encountered in hoppers or the conveying system. Six hot precipitator installations already operating on a pulverized coal boiler fly ash cover a variety of differing applications.
APTIC-24675

SELECTION OF GAS CLEANING EQUIPMENT FOR AN ORE PREPARATION PLANT.

Iron Steel Engr., 47 (11):111-115, Nov. 1970.
Billy D. Egley.
Identifiers: *Sintering, *Electrostatic precipitators, *Iron oxides, Iron, Steel, Stack gases, Primary metallurgical processing, Pilot plants, Sampling methods, Stack sampling.

A Colorado steel corporation established a separate department in 1966 to determine the areas of air and water pollution, to devise methods of treatment for areas requiring some type of pollution control, to initiate the installation of equipment which would provide satisfactory pollution control, and to act as the liaison between the company and the various air and water pollution control agencies. One of the department's first targets was the highly visible red oxide plume emitted from the main sinter plant stack, especially evident when insufficient moisture was added to the sinter mix. A three-phase plan was developed which consisted of stack sampling in order to gather background information, pilot testing of a variety of gas cleaning equipment, and selection and installation of the equipment. The final decision to install an electrostatic precipitator at the sinter plant was based on the following reasons: they were guaranteed to meet the emission specifications of less than 0.025 grains per dry scfm; less maintenance would be required and, as the precipitator contains few moving parts, no additional fans would be required because of the low pressure drop through the unit; normal mechanical and electrical problems could be isolated without disrupting the sinter process while still maintaining reasonable gas cleaning efficiency; cleaning of the gas electrostatically would not involve possible contamination of the plant effluent waste water streams.
APTIC-24676

CONTROL OF NITROGEN OXIDE EMISSIONS FROM STATIONARY COMBUSTION SOURCES.

Combustion, 42 (4):37-40, Oct. 1970. (Presented at the AICHE-IMIQ Joint Meeting, 3rd, Denver, Colo., Aug. 30-Sept. 2, 1970.)
W. Bartok, A. R. Crawford, and A. Skopp.
Identifiers: *Control methods, *Nitrogen oxides, Costs, Combustion gases, Stack gases, Boilers, Coal, Fuel gases, Electric power production, Scrubbers, Absorption, Adsorption, Excess air, Alkaline additives, Catalysis, Decomposition, Reduction, Combustion, Reaction kinetics.

Cost-effectiveness analyses of potential oxides of nitrogen control methods are presented for stationary combustion sources, and research and development needs in this area are critically evaluated. National Air Pollution Control Administration sponsered research related to stationary NOx control is discussed, including modeling of NO kinetics in combustion processes and the scrubbing of NOx from flue gases. The major factors known to influence the NOx emissions from combustion processes are the amount of excess air used for combustion, the heat release and removal rates, which define the temperature-time history of the combustion gases, transport effects, and fuel type and composition. Combustion flue gas treatment processes have been evaluated in the following general categories: catalytic decomposition of NOx, catalytic reduction of NOx, physical separation of NOx from the other components of the flue gas, adsorption of Nox by solids, and absorption of NOx by liquids. Aqueous absorption systems using alkaline solutions or sulfuric acid appear to offer the most promise for combined control of nitrogen and sulfur oxide emissions. In simple terms, cost effectiveness is defined as the ratio of the annual control cost to the tons of NOx removed. The estimated degree of NOx reduction and associated costs resulting from the application of potential control techniques are presented for a 1000 MW gas-fired, and a 1000 MW coal-fired power plant boiler. (Author abstract modified)
APTIC-24678

DUST COLLECTION AT ITMANN PREPARATION PLANT.

Mining Congr. J., 56 (11):67-70, Nov. 1970
Charles W. Porterfield.
Identifiers: *Dusts, *Coal, *Collectors, Mineral processing, Particle size, Centrifugal separators, Scrubbers, Drying, Flow rates.

Originally equipped only for pre-drying of fine coal and primary dust collection, Itmann Coal Co. now has a modern fluid bed thermal dryer served by a total dust collection system. The thermal dryer purchased was a No. 170 Heyl and Patterson fluid-bed dryer with 170 sq ft of drying bed area, while American Air Filter Company provided 24-inch multitude cyclones arranged in six rows of seven each for a total of 42 cyclones in the dry dust collector. Because of the high volume of gas, American Air Filter Co. elected to use two six ft diam Kinpactors in parallel; two 35 by 17 1/2 ft diam, 316 stainless steel mist eliminators were in-

stalled on the outlet of the Kinpactors to prevent carryover of water droplets. The dryer fan, supplied by Green Fuel Economizer Co., was designed to provide a total pressure differential of 36 inches. The scrubber system requires about eight gal of water per 1000 cfm, but because recirculation of some solids is permissible, only about two gal per 1000 cfm of makeup water is necessary.
APTIC-24679

A LOAD SHIFTING MODEL FOR AIR POLLUTION CONTROL IN THE ELECTRIC POWER INDUSTRY.

J. Air Pollution Control Assoc., 20 (11):756-761, Nov. 1970. 9 refs.
Donald S. Shepard.
Identifiers: *Load shifting, *Electric power production, Costs, Africa, St louis, Urban areas, Process modification, Diffusion models, Meteorology, Sulfur dioxide.

Load-shifting, a relatively inexpensive approach to air pollution control, involves transferring the generating load from one power plant to another according to meteorological conditions. An atmospheric dispersion model is adapted to estimate the exposure of the urban population to sulfur dioxide from operating the power system in different ways. Then a mathematical model of the power system of a metropolitan area is constructed to determine the reduction in pollution exposure which could be achieved, and the costs involved. As a case study, the application of the model to St. Louis, Missouri, is simulated. Under favorable conditions, load shifting could reduce pollution exposure up to 95%, while increasing the costs of electric power generation by only 4%. The load-shifting model has use not only as an operational control strategy, but also as an analytical tool to evaluate alternative pollution control measures in the electric power industry. (Author abstract)
APTIC-24681

INITIATIVE FOR WATER AND AIR POLLUTION CONTROL.

(Initiative fuer Wasser-und Luftreinhaltung). Text in German. Wasser Luft Betrieb, 14 (9):375-378, Sept. 1970.
Personal Author Not Recorded.
Identifiers: *Nordrhein-westfalen, *Abatement, *Plans and programs, *State governments, Air quality measurement programs, Control programs, Germany, Rivers, Blast furnaces, Nuclear power plants, Steam plants, Incineration, Primary metallurgical processing, Sewage, Solid waste disposal, Composting, Dumps, Water pollution, Sintering, Power sources, Nuclear power sources, Continuous monitoring, Fluorine compounds, Halogenated hydrocarbons, Brominated hydrocarbons, Hydrocarbons, Organic nitrogen compounds, Acridines, Sulfur compounds.

The Nordrhein-Westfalen Program 1975 contains an outline of water conservation, air pollution, and refuse disposal perspectives for the next 5 years. Discussed are water conservation, river pollution control, natural water pollution 1970 and 1975, waste disposal, air pollution control, new sources of pollution, current control of air quality, and noise control. Drinking water supply will be increased by increasing the capacity of water clearing installations, the water quality of the Rhine river and of its tributaries will be controlled by a number of automatic measuring stations; about 300 new biological clearing installations will be built. Controlled refuse dumps will be established for each 20,000 inhabitants; composting of refuse and incineration will serve larger population units. New air pollution measures are planned for Thomas steel converters, ore sintering plants, coke ovens, foundries, and steam power plants. New sources of pollution to be dealt with include the increasing number of atomic power plants being built and the tremendous growth rate of the chemical industry. Supervision of air quality will extend to fluorine, hydrocarbons, offensive sulfur and nitrogen compounds, dust concentration, chlorinated hydrocarbons, and oxidants. Noise pollution control will be concerned with the design and building of silent machines, motors and equipment, with improving insulation against noise, with a registration of sources of noise, and with noise control research.
APTIC-24683

ABSTRACTS OF PAPERS ON INDOOR AIR POLLUTION (SUSPENDED PARTICULATES) CONTROL IN ARCHITECTURE. PART I.

For primary bibliographic entry see Field 03.
APTIC-24684

THE POSSIBILITY OF DECREASING THE CARBON MONOXIDE CONTENT OF EXHAUST GASES FROM BENZENE ENGINES.

(O vozmozhnosti umen'sheniya okisi ugleroda v otrabotannykh gazakh benzinovykh dvigateley). Text in Russian. Gigiena i Sanit., 35 (8):118-119, 1970. 1 ref.
K. I. Petriashvili.
Identifiers: *Carburetion, *Carbon monoxide, Ussr, Engine exhausts, Internal combustion engines, Excess air.

A pulsed carburetion scheme, which employs auxiliary injection of compressed air into the combustion chamber, allows gasoline engines to operate on a leaner mixture, and results in reduced carbon monoxide content in the exhaust gases. Use of this scheme with a ZIL-120 engine operating at 1600 rpm and a coefficient of excess air of 1.25-1.45 resulted in a reduction of CO emissions from 4.4 to 0.1%, as compared with conventional carburetion.
APTIC-24689

PERMEABLE MEMBRANE.

Gen. Elec. Co. Res. Lab. Bull., Winter 1964-1965:7-8.
W. L. Robb.
Identifiers: *Silicon compounds, *Membrane filters, Spacecraft atmospheres, Carbon dioxide, Oxygen, Gases, Liquids, Vapors, Permeability.

A silicone membrane is described that has the ability to select the gases passing through it and which is more permeable than any previously reported silicone membranes. Potential applications of the membrane include dehumidifying air, purifying air in space capsules, and supplying submarine crews with air and fresh water and patients with oxygen at costs less than those of oxygen cylinders. Though it hs no holes, the membrane permits the passage of liquids and gases. On a space capsule, an opening covered with such a membrane would allow water vapor and carbon dioxide to escape into the vacuum of space, while holding vital oxygen in. This is because different gases pass through the membrane at different rates, and water vapor and carbon dioxide pass through it much more quickly than oxygen. In ordinary air, the amount of oxygen passing through the membrane can be regulated by varying the pressure on the side of the membrane not in contact with air. To meet man's oxygen needs would require as little as two and one-half square yards of the membrane.
APTIC-24694

HIGH-EFFICIENCY FIBRE FILTERS FOR THE TREATMENT OF FINE MISTS.

Trans. Inst. Chem. Engrs. (London), vol. 36:476-485, 1958. 3 refs.
G. Lowrie Fairs.
Identifiers: *Silicon compounds, *Mists, *Contact processing, *Filter fabrics, Synthetic fibers, Great britain, Particle size, Filters, Treated fabrics, Scrubbers, Absorption (general), Design criteria, Sulfuric acid.

The treatment of contact process sulfuric acid plant tail gases to remove completely a sulfuric acid mist with particles of less than two micron was studied. If a filter of fine glass-wool is treated with a silicone to provide a water repellent surface, the acidity of the gases leaving the filter is reduced to 0.2% of the inlet acidity as compared with 2.5% for untreated wool under similar operating conditions. This twelve-fold improvement of scrubbing efficiency is important, since the gases scrubbed with the silicone-treated fiber were invisible when vented to the atmosphere, while a visible plume persisted after scrubbing with the untreated fiber. A scrubbing efficiency of 99.6% was obtained with a garnetted Terylene polyester fiber, which is in itself water repellent. Comparative performance data for the two filters are summarized. (Author abstract modified)
APTIC-24695

SUMMARY OF STATEMENT OF JOHN O. LOGAN AND C. G. GERHOLD OF UNIVERSAL OIL PRODUCTS CO., DES PLAINES, ILL., WASHINGTON, D. C., MARCH 20, 1970.

In: Air Pollution-1970, Part 3. 91st Congress (Senate), Second Session on S.3229, S.3466, S.3546, p. 1141-1150, 1970. (Hearings before The Subcommittee on Air and Water Pollution of the Committee on Public Works and the Committee on Commerce, March 24, 25, 1970.
John O. Logan, and C. G. Gerhold.
Identifiers: *Automotive emission control, Costs, Senate hearings, Engine exhausts, Gasolines, Air-fuel ratio, Engine design modification, Fuel additives, Catalytic afterburners, Olefins, Aromatic hydrocarbons, Tetraethyl lead, Nitrogen oxides.

The results of research on control of automobile emissions are presented. In order to achieve best possible control, a combination of engine redesign, fuel control, and catalytic converter system must be employed. Data resulting from the installation of a catalytic converter on a standard vehicle with modified carburetion using lead-free gasoline are presented. Catalytic control of nitrogen oxide and hydrocarbons is obtained. Strict control of air-fuel ratios are necessary to achieve the desired control. Similar results could not be achieved with conventional leaded gasoline. A discussion of the role of lead in achieving octane ratings is included. Tampering with olefins and aromatics in fuel should be considered with extreme caution. Refining costs and technology to produce optimum fuels are discussed.
APTIC-24696

FLUE-GAS WASHING PROCESS. PART TWO.

Power Works Eng., vol. 41:37-40, Feb. 1946. 4 refs. Part I. Ibid., vol. 41:17-21, 25, Jan. 1946. Part III. Ibid., vol. 41:75-77, March 1946. Part IV. Ibid., vol. 41:103-105, April 1946.
W. Francis.
Identifiers: *Stack gases, *Control equipment, *Design criteria, Costs, Corrosion, Copper alloys, Steel, Rubber, Wood, Great britain, Dusts, Boilers, Coal, Electric power production, Electrostatic precipitators, Fans (blowers), Filters, Packed towers, Process modification, Alkaline additives, Calcium sulfates, Sulfur dioxide, Sulfites.

Comparison is made between two types of gas-washing systems and electrostatic precipitators, and technical features of the available non-by-product recovery processes are summarized. Both the effluent system, as developed at Battersea, and the non-effluent system, as developed from the Howden-I.C.I. pant at Fulham, have proven to be practical processes for any type of boiler plant fitted with induced or balanced draught fans. The additional cost of the gas-washing processes over the necessary cost of dust and grit removal by dry systems of equal efficiency is small. For this additional charge nearly all the harmful products of coal combustion are removed instead of less than 50%, as in the case of the most efficient electrostatic precipitators. It is suggested that the restrictions on the amount of sulfur oxides permitted in

the exit gases from gas-washing plants should be relaxed to ensure greater freedom from operational difficulties. (Author conclusions modified)
APTIC-24697

SIMULTANEOUS RECOVERY OF LOW-CONCENTRATION SULFUR OXIDES AND NITROGEN OXIDES WITH ALKALIES AND CARBONATES. IV. ABSORPTION WITH MAGNESIUM HYDROXIDE.

For primary bibliographic entry see Field 06.
APTIC-24704

PURIFICATION OF FUMES IN THE LACQ COMPLEX.

(L'epuration des fumees dans le complexe de
Lacq). Text in French. Tech. Moderne, 1969:313-
316, Aug.-Sept. 1969.
P. Bapseres.
Identifiers: *Catalytic oxidation, *Absorption (general), France, Combustion gases, By-product recovery, Peter spence process (claus), Hydrogen sulfide.

The gas of Lacq is a complex mixture of hydrocarbons, hydrogen sulfide, carbon dioxide, and water. At the surface, the raw gaseous effluent has two phases, liquid and solid. The desulfurization of the raw gas is obtained through washing with water solutions of ethanolamines. Sulfur is obtained through the mechaniam of the Claus reaction. The problem faced is how to recuperate 300 tons of sulfuric gaseous components each day. Methods employed are described. Absorption with thermic treatment involves the absorption of SO2 in a suspension of metal oxides (CaO, MgO, ZnO, alumina) giving sulfites separating in solid form. Disadvantages are difficulty of starting up the suspension, partial oxidation of sulfites in sulfates, and dissipation of caloric energy, important for the roasting of solid sulfites. Absorption in liquids involves washing gases with liquids (water or organic). This leads to solution reactions or sulfuric chemical combinations. The second method is subdivided into a cyclic method with liquid absorbents and a method of absorption with isolation of definite products. The method of recuperation through formation of sulfuric acid is based on oxidation of SO2 in SO3 used for preparing pure sulfuric acid. Cyclic methods on solid absorbents, active charcoal, and silicon jelly are regenerated through hot air or steam. So far, best results have been achieved using a process of oxidation with wet catalysts belonging to method 3. A description of the installation is given. It contains two sections: a) incinerator-converter, where H2S and S2 are converted to SO2 and SO2 is converted to SO3; and b) absorption-concentration, where 80% of SO3 is absorbed into acid and the acid is concentrated to 94%.
APTIC-24706

DESULFURIZATION OF FLUE GASES- THE PRESENT SITUATION. PART I.

(Avsvavling av rokgaser- nuvarande lage I). Text
in Swedish. VVS (J. Assoc. Heating, Ventilation,
Sanit. Engrs.) (Stockholm), vol. 8:442-447, 1969.
PART II. Ibid., vol. 9:489-497, 1969. 21 refs.
Gosta Bahno.
Identifiers: *Steam plants, *So2 removal (combustion products), Costs, Fuel standards, Japan, Germany, Sweden, United states, Stack gases, Absorption (general), Alkaline additives, Alkalized alumina (adsorption), Manganese dioxide (japanese), Penelec (contact process), Reinluft process (adsorption), Scrubbers.

Available data on different American, German, and Japanese desulfurization methods show that for Sweden, with only two oil-fired power plants greater than 300 MW, flue gas cleaning would be too expensive and complicated. Some of the recovered products would become a serious waste problem. If regulations are adopted with a sulfur limit of about 0.5% or lower for fuels, then desulfurization methods seem to be realistic. The following processes are discussed: Mitsubishi-DAP-Mn, Hitachi activated coal (absorption), Kiyoura T.I.T. (ammonia), Showa Denko ammonia, alkalized alumina process, Dolomite injection wet process, Penelec process, Wellman-Lord process (Bechwell scrubbing), sulfacid process, Grillo process, Bischoff process, Dolomite injection dry process, Reinluft process, and Still process.
APTIC-24707

DESULFURIZATION OF FLUE GAS WITH ADSORPTION COKE OF VARIABLE PROPERTIES.

(Rauchgasentschwefelung mit Adsorptionskoksen
unterschiedlicher Eigenschaften). Text in German.
Staub, Reinhaltung Luft, 27 (7):301-307, July 1967.
10 refs.
Heinrich Dratwa, and Harald Juentgen.
Identifiers: *Coke, *Adsorption (general), Germany, Stack gases, Particle size, Surface properties.

In the case of desulfurization of flue gas by means of adsorption coke the properties of the products used are of decisive importance. Coke from peat and from air-oxidized hard coal, and charcoal differ considerably regarding their kinetic behaviour during the binding of sulfur dioxide. The formation of surface oxides, which is a secondary reaction, also develops for these products at different velocities. The strength of adsorption coke, which is of particular importance and is a function of chemical combustion occurring in this process, depends on the original material and also on production conditions of coke. Products formed by means of an extrusion press have a basically higher strength than granular materials. The flow resistance of coke, which depends on the size and form of particles, is particularly low in the case of spherical pellets. (Author abstract modified)
APTIC-24709

EXHAUST MANIFOLD THERMAL REACTORS - A SOLUTION TO THE AUTOMOTIVE EMISSIONS PROBLEM.

In: Air Pollution - 1970. Part 2. 91st Congress
(Senate), Second Session on S.3229, S.3446,
S.3546, p. 521-538, 1970. (Hearings Before the
Subcommittee on Air and Water Pollution of the
Committee on Public Works, March 19, 20, and
23, 1970.) (Presented at the National Petroleum
Refiners' Assoc. Annual Meeting, 69th, San
Antonio, Tex., April 5-8, 1970.)
J. J. Mikita, and E. N. Cantwell.
Identifiers: *Exhaust manifold thermal reactor, *Automotive emission control, Senate hearings, Emission standards, Flame afterburners, Collectors, Design criteria, Hydrocarbons, Lead compounds, Carbon monoxide, Nitrogen oxides, Oxidation, Temperature.

An exhaust emission control system is described which comprises an exhaust manifold thermal reactor to control the hydrocarbons and carbon monoxide and an exhaust gas recirculation system to control nitrogen oxide levels. This system will meet the proposed standards for 1975 which require that hydrocarbons be reduced to less than 0.5 gram per mile, carbon monoxide to 11 grams per mile, nitrogen oxides to 0.9 gram per mile, and particulate matter to 0.1 gram per mile. The reactors provide a high-temperature zone in which the hydrocarbons and carbon monoxide are oxidized thermally to carbon dioxide and water. They will also operate satisfactorily with leaded fuels, while long-term tests have shown that they are capable of controlling HC and CO emissions for the normal life of the vehicle or 100,000 miles without any maintenance. Considerations do exist which pertain to its size and the excessively high temperatures in the interior of the reactor. Introduction of the exhaust gas into the carburetor dilutes the incoming fuel/air mixture to the engine with the inert material (exhaust gas) and lowers the peak combustion temperatures within the cylinder, thus reducing the formation of nitrogen oxides. With regard to the removal of lead particulate from the exhaust gas stream, one of the more effective ways to accomplish separation and retention of such particulates is to employ an inertial device, such as a cyclone.
APTIC-24722

THE FELD SCRUBBER FOR CLEANING METALLURGICAL SMOKE.

Eng. Mining J., 113 (5):198-207, 1922.
W. F. Lamoreaux.
Identifiers: *Primary metallurgical processing, *Spray towers, *By-product recovery, *So2 removal (combustion products), Copper, Stack gases, Operating variables, Design criteria, Zinc compounds, Sulfur compounds, Reduction.

A description is provided of a spray tower counterflow scrubber used to clean the flue gas of a copper smelter. Unique application of this unit is that the particulates recovered are reprocessed for their zinc content and the gas is processed for elemental sulfur. A brief history is given of the failures experienced with dry centrifugal cleaning, wet baffle cleaning, bag filters, and electrostatic precipitation. The Feld scrubber with which success was finally achieved is a seven layer system in which primary washing is performed in the lower three chambers, separation in middle section, and cooling and dehumidification is performed in the upper three chambers, although this may be varied at the will of the operator. Wash water is admitted at the selected level and atomized by the rotary motion of the perforated central cones and again by impact with the outer wall. Rim speed of the cones is approximately 2000 fpm. Gas is admitted at the bottom and passes upward through the mist of wash water. Capacity of the unit is 200,000 cfh with wash water recirculated at a rate of 65 gpm. During initial operation some SO2 is lost by disolving into the wash water, but when the water becomes saturated, effectively all of the SO2 is available to the sulfur reduction unit, and the saturated wash water apparently does not inhibit the particulate recovery. Purity of the reduced flowers of sulfur is 99.2%. The scrubber operates on a 24 hour day, seven days a week basis, requiring only lubrication to keep it in operation which can be applied without stopping the equipment.
APTIC-24724

PIPELINE GAS FROM LIGNITE GASIFICATION: CURRENT COMMERCIAL ECONOMICS.

For primary bibliographic entry see Field 10.
APTIC-24727

THE IMPORTANCE OF PROTECTIVE PLANTINGS AGAINST AIR POLLUTANTS.

(Die Bedeutung von Schutzpflanzungen gegen
Luftverunreinigungen). Air Pollution. Proc. First
European Congr. Influence Air Pollution Plants
Animals, Wageningen, Netherlands, 1968, p. 383-
395. Translated from German. Belov and
Associates, Denver, Colo., 16p., Sept. 9, 1970.
A. Bernatzky.
Identifiers: *Planning and zoning, *Forests, Trees, Germany, Stack gases, Particulates, Dusts, Atmospheric movements, Winds, Humidity, Radioactive radiation.

As indicated by a review of the literature, forest belts do not solve the problem of air pollution but, when properly planned, will facilitate the reduction of air pollutants. Though generally ineffective in the case of sulfur dioxide, pollution-resistant species reduce atmospheric concentrations of dust and of solid and gaseous radioactive substances. In addition, they reduce noise, prevent binding of SO2, and increase the relative humidity of air. Solid particles can be filtered from the atmosphere by planting open stands of trees or shrubs. Dense stands are needed for gaseous pollutants. In protective plantings, the longitudinal axes have to run across the prevailing wind direction. In areas

without wind, e.g., towns, hot air ascends and relatively cold air pours in from all sides, leading to the accumulation of polluted air in the center that has to be filtered by concentric plantings. The closer the forest strips to the source of smoke, the greater their effectiveness. (Author summary modified)
APTIC-24730

ABSORPTION OF SO2 GAS BY VARIOUS SOLVENTS.

(Aryusangasu no yobaikyushu). Osaka
Engineering Labs. (Japan), p. 658, 1969 (*).
Translated from Japanese. Franklin Inst. Research
Labs., Philadelphia, Pa., Science Info. Services,
2p., Oct. 21, 1969.
Hiroshi Sano, Yoshimune Yo, and Yoshie
Nakamoto.
Identifiers: *Solubility, *Solvents, *Absorption (general), Japan, Iodimetric methods, Alcohols, Esters, Ethers, Aliphatic hydrocarbons, Aromatic hydrocarbons, Reaction kinetics.

For the purpose of recovering dilute sulfur dioxide gas, the solubility of SO2 to various organic or mixed solvents was studied. Sulfur dioxide gas was led through 50 ml of solvent at 1 atm and 30 C. When the solvent was saturated with the absorbed gas, it was diluted by 10 liters of alkaline water. Dissolved SO2 from a certain quantity of solution was measured by iodine titration. Among pure solvents, the SO2 solubility increased in the following order: saturated hydrocarbon, water, aromatic hydrocarbon, alcohol, ester, ether, ring ether, formamide, DMF, and DMSO. In the case of mixed solvents, on the other hand, the solubility can be classified into a convex solubility curve, linear solubility curve, and concave solubility curve. When two polar solvents of non-hydrogen bond are mixed with each other, the solubility shifts toward that of higher solubility. As a result, the solubility curve becomes convex, and sometimes a maximum value shows up. The solubility becomes linear when two solvents with little interaction are mixed together. When a good solvent is mixed with a poor solvent with a hydrogen bond, such as water, the dissolving power is drastically reduced and the solubility shifts towards that of the poor solvent.
APTIC-24735

FLUE-GAS WASHING PROCESSES. PART THREE.

Power Works Eng., vol. 41:75-77, March 1946. 2
refs. Part I. Ibid., vol. 41:17-21, 25, Jan. 1946. Part
II. Ibid., vol. 4:37-40, Feb. 1946. Part IV. Ibid., vol.
41:103-105, April 1946.
W. Francis.
Identifiers: *By-product recovery, *Sulfur dioxide, *Compressed gases, Cements, Great britain, Kilns, Packed towers, Sulfuric acid, Ammonium compounds, Carbonates, Toluenes, Xylenes, Aluminum compounds, Calcium sulfates, Oxidation, Reduction, Temperature.

Several processes for the recovery of sulfur from flue gases are described; (products that are in demand and command a reasonable market value are elemental sulfur, liquid sulfur dioxide, sulfuric acid and ammonium sulfate.) The sludge obtained by washing boiler flue gases with lime or chalk consists of mixtures of calcium sulfate and sulfite, coal ash, carbon, and excess alkali. With a fully oxidized sludge, the CaSO4 may be converted to ammonium sulfate by digesting with a solution of ammonium carbonate. The solution of (NH4)2SO4 is filtered to remove solids, treated to ensure complete oxidation, concentrated and recovered as neutral, dry crystals. An alternative is described not requiring the complete oxidation of calcium sulfite to be successful, in which the products are cement and either solid sulfur, liquid sulfur dioxide, or sulfuric acid. A method is described for obtaining concentrated SO2 from gases containing relatively low concentrations. Certain solutions, such as aluminum sulfate, can dissolve large quantities of SO2 at high efficiencies, and liberate them in concentrated form when the temperature is raised. A mixture of water and aromatic bases, such as toluidine and xylidine, possess the property of reducing the formation of sulfate by oxidation of a portion of the SO2 absorbed in the basic aluminum sulfate process. Sulfur dioxide may be reduced to sulfur by reacting with carbon or carbon monoxide at elevated temperatures.
APTIC-24737

ABATEMENT OF AIR POLLUTION IN THE CHEMICAL INDUSTRY.

For primary bibliographic entry see Field 01.
APTIC-24743

METAL HYDRIDES AS A SOURCE OF FUEL FOR VEHICULAR PROPULSION.

Preprint, Society of Automotive Engineers, Inc.,
New York, 6p., 1969. 9 refs. (Presented at
International Automotive Engineering Congress,
Detroit, Mich., Jan. 13-17, 1969, Paper 690232.)
K. C. Hoffman, W. E. Winsche, R. H. Wiswall, J.
J. Reilly, and T. V. Sheehan.
Identifiers: *Fuels, *Automotive emission control, *Hydrides, *Metal compounds, Engine exhausts, Internal combustion engines, Engine design modification, Ammonia, Hydrocarbons, Copper compounds, Magnesium compounds, Nickel compounds, Carbon dioxide, Carbon monoxide, Nitrogen oxides, Peroxides, Ozone.

The use of hydrogen stored in a metal hydride as a fuel for an internal combustion engine is considered, based on studies of the equilibrium relationships and kinetics of the reversible reaction of hydrogen with magnesium-nickel and magnesium-copper alloys. These studies indicate that such systems have properties that may form the basis of a convenient and inexpensive method of storing hydrogen. The exhaust of such a vehicle would be free of hydrocarbon, carbon dioxide, and carbon monoxide emissions. The characteristics of magnesium hydride, previous development work on a hydrogen engine, and aspects of vehicle design are reviewed. Comparisons are made between this and other hydrogen-storage methods, between hydrogen and gasoline as a fuel, and between various vehicle concepts. With the absence of hydrocarbons from a hydrogen engine exhaust, the pollutants that can be formed are oxides of nitrogen, hydrogen peroxide, ammonia, and ozone. The hydrogen-fueled vehicle appears to be an attractive near-term alternative to current vehicles in comparison with the other inherently hydrocarbon-free concepts (including batteries and fuel cells) that are being seriously considered, and represents a minimum departure from current automotive practice. Major areas recommended for future study in order to evaluate the full potential of this concept are outlined.
APTIC-24746

A PROCESS FOR THE REMOVAL OF SULFUR COMPOUNDS FROM HOT CRACKING GAS.

(Verfahren zur Entfernung von
Schwefelverbindungen aus heissen Spaltgases).
Text in German. (Pintsch Bamag A. G., Berlin and
Butzbach, Butzbach (Obhess.), Berlin (West
Germany)) West Ger. Pat. 1,184,895. 2p., Jan. 7,
1965. (Appl. Jan. 25, 1963, 1 claim).
Wilhelm Guntermann, Friedrich Fischer, and
Hubert Kraus.
Identifiers: *Alkaline additives, *Calcium compounds, Limestone, Germany, Combustion gases, Fuel gases, Centrifugal separators, Carbonates, Oxides, Carbon dioxide, Sulfides, Hydrogen sulfide.

The removal of sulfur compounds from hot cracking gas is accomplished by means of calcium oxide. The precipitating aqueous calcium sulfide suspension is saturated with carbon dioxide and the resulting calcium carbonate is returned into the desulfurization process. The CO2 required in the process can be produced to advantage by washing combustion gas. The process provides for a better than 90% conversion of calcium sulfide to carbonate and the simultaneous release of equivalent quantities of hydrogen sulfide. The conversion can be accelerated by heating. The suspension should be kept in agitation during saturation with CO2 by means of a mixer or a pump. The resulting CaCO3 is removed by filtering and returned in wet condition to the desulfurization process where it is dried and converted to CaO by the hot cracking gas. The dust particles carried by the desulfurized gas are removed by a cyclone separator and transported, together with the calcium sulfide, into the suspension vat which is then saturated with CO2. The hydrogen sulfide containing gas is processed as desired.
APTIC-24749

INSTALLATION FOR THE ABSORPTION OF SULFUR DIOXIDE.

(Einrichtung zur Absorption von
Schwefeldioxyd). Text in German. (Babcock and
Wilcox Co., New York) West Ger. Pat. 1,241,250.
9p., March 24, 1967. (Appl. June 30, 1959, 1 claim).
Charles Ellis Rogers, Robert Ewing Matty, and
Edward Lynn Ralston.
Identifiers: *Venturi scrubbers, *Absorption (general), *Design criteria, Combustion gases, Chemical processing, Kraft pulping, Paper manufacturing, Centrifugal separators, Scrubbers, Sulfur oxides control, So2 removal (combustion products), Magnesium compounds, Sulfites, Ph.

Equipment for the absorption of sulfur dioxide from combustion gases of Magnesium containing waste water from cellulose plants, especially from the bisulfite process, is described. It is designed to eliminate the drawback of the currently used method where SO2 saturation of the absorption liquid limits the absorption capacity by precipitating MgSO3 from the solution and thus terminates the absorption of SO2 by MgSO3 in the solution which yields magnesium bisulfite. The installation absorbs SO2 in an aqueous suspension of MgO with a pH of 4-7 by means of two consecutively connected venturi scrubbers with the suspension entering through spray nozzles. This arrangement operates with much higher levels of dissolved MgSO3 in the absorption liquid than the conventional method thereby minimizing the danger of precipitation. The cause for this increased solubility under conditions of this arrangement is thought to be the constant agitation of the liquid from the moment of monosulfite formation up to the moment of contact with the SO2 containing gas. At a liquid temperature of 49 C, a monosulfite concentration of 0.9% can be reached, expressed as SO2, at which concentration a 72% absorption of SO2 from the gas can be achieved. The absorbent liquid consisting of Mg (HSO3)2 and MgSO3 is sprayed into the scrubbers parallel with the gas flow. The liquid is separated from the gas by centrifugal force in a separator. The washing liquid leaving the installation is returned to the cellulose manufacture.
APTIC-24750

PROCESS FOR THE CONVERSION OF HYDROGEN SULFIDE WITH SULFUR DIOXIDE TO ELEMENTARY SULFUR.

(Verfahren zum Umsetzen von
Schwefelwasserstoff mit Schwefeldioxyd unter
Bildung von elementarem Schwefel). Text in
German. (American Smelting and Refining Co.,
New York) West Ger. Pat. 1,088,936. 10p., Sept.
15, 1960. (Appl. Nov. 7, 1955, 4 claims).
Edward P. Fleming, and Theodore Cleon Fitt.
Identifiers: *Catalytic oxidation, *So2 removal (combustion products), *Hydrogen sulfide, Combustion gases, By-product recovery, Aluminum compounds, Combustion, Flow rates, Temperature.

In the process for converting hydrogen sulfide with sulfur dioxide to elementary sulfur, the gas mixture passes at atmospheric pressure through a catalytic bed (bauxite) in a catalytic combustion chamber in which a conversion temperature zone

of 400 to 600 C is achieved by a 2:1 Mol ratio of H2S and SO2 with the diluting gases not exceeding 60% of the gas mixture by volume. Gas flow velocity must be so regulated as to prevent the migration of the conversion temperature zone from the catalytic bed in the direction of the gas flow. The gas entering the reaction chamber is preheated by heat exchange with the reaction gas to 335 C. Following conversion and removal of the elementary sulfur, air is added to the remaining gas and the remaining H2S is converted by combustion to SO2 which is returned to the above process. The equilibrium of the H2S plus SO2 reaction leads to a conversion quotient of 75% or better. In another modification of the method, the original H2S flow is divided into 2 flows, one containing two thirds, the other one third of the H2S. This latter part is burned with air to SO2 and is returned into the process following the separation of the diluting gas.
APTIC-24751

A METHOD OF OXIDIZING HYDROGEN SULFIDE TO ELEMENTARY SULFUR.

(Verfahren zur Oxydation von
Schwefelwasserstoff zu elementarem Schwefel).
Text in German. (Badischen Anilin- und Soda-
Fabrik A. G., Ludwigshafen (West Germany))
West Ger. Pat. 1,091,995. 5p., Nov. 3, 1960. (Appl.
June 11, 1959, 1 claim).
Werner Fuchs.
Identifiers: *Catalytic oxidation, *Aliphatic hydrocarbons, *Hydrogen sulfide, Germany, Combustion gases, Packed towers, By-product recovery, So2 removal (combustion products), Aromatic hydrocarbons, Temperature.

Hydrogen sulfide is oxidized with oxygen and/or sulfur dioxide containing gases or with SO2 to elementary sulfur in the presence of solvents of a general chemical formula R1-CO-NR2R3. The R1, R2, and R3 are substitutes for H atoms, alkyl, cycloalkyl, oxalkyl, aminoalkyl or substituted phenyl groups; R2 or R3 (or both) are organic radicals; and for R1, R2, and R3 can be substituted polymethylenic remnants forming with the amidic nitrogen atom a heterocyclic ring which can contain a further nitrogen atom or an oxygen or a sulfur atom. The oxidizing gases are used in calculated quantities, but a surplus of oxidizing agents will not result in oxidation beyond S. The gas containing H2S enters at the bottom of a reaction tower filled, for example, with ceramic packing material together with the oxidizing gas with the solvent (dimethyl formamide, n-methyl pyrrolidone, etc.) trickling down over the packing material; or activated carbon, pumice, etc. can be saturated with the solvent and the reaction gas passed through. Oxidation takes place preferably between 15 and 120 C at atmospheric pressure and can be continuous or discontinuous.
APTIC-24752

RESULTS OF THERMAL AND OF CATALYTIC PROCESSES TO LIMIT OLFACTORY EMISSIONS OF ORGANIC CHEMICAL COMPOUNDS.

(Ergebnisse thermischer und katalytischer
Verfahren zur Einschraenkung geruchsintensiver
Emissionen organisch-chemischer Verbindungen).
Text in German. Landesanstalt fuer Immissions-
und Bodennutzungsschutz, Essen (West
Germany), 9p., 1970 (*). 13 refs.
U. Franzky.
Identifiers: *Odors, *Catalytic oxidation, *Combustion, Germany, Food and feed operations, Coffee-making, Paint manufacturing, Heat of combustion, Temperature.

A reliable process for the elimination of emissions of organic chemical compounds with an objectionable smell is thermal combustion. Organic compounds are completely destroyed by heating the exhaust gas flow to above 800 C for a sufficiently long time. The process is expensive because the oxidation does not generate heat. The concentration of olfactory substances is always minute and all heat for the combustion has to be provided from the outside. Catalytic combustion which achieves satisfactory combustion at temperatures between 350 and 400 C is therefore used more frequently. Such temperatures can often be produced by means of heat exchangers. But catalytic purification cannot be applied universally because dust and other admixtures (phosphorus compounds for example) can prematurely deactivate the catalyst. With catalytic combustion at temperatures above 350 C, residual concentrations are largely independent of the nature and quantity of the original impurities. The effectiveness of these processes is judged by the carbon content of the gas before and following combustion. Thermal and catalytic installations designed to reduce objectionable emission from lacquer drying furnaces, from polyvinyl chloride jelling canals, from coffee and malt roasting drums, from curing chambers and other emission sources are described.
APTIC-24754

TREATMENT OF WASTE AIR AND GASES IN THE PROCESS INDUSTRIES.

ACHEMA, Proceeding of a Symposium on the
Disposal of Process Wastes, Liquids, Solids,
Gases, Frankfurt au Main, West Germany, 1964,
p. 147-155. 8 refs. Also: DECHEMA Monograph
Ser., 52 (895-911), 1964.
Erich Herrmann.
Identifiers: *Fumes, *Chemical processing, *Control methods, Carbon black, Germany, Solvents, Adsorption, By-product recovery, Catalytic oxidation, Gases, Vapors, Temperature.

A discussion is presented of methods for recovering odorous and toxic gases, fumes, and vapors from chemical processes and solvent vaporizing activities. Special attention is given to the recovery of partially water-soluble solvent mixtures by adsorption, to solvent recovery by adsorption with successive rectification, and to catalytic combustion with recovery of heat. Recovery of solvent vapors through the activated carbon process is simplified by using one adsorber or group of adsorbers for recovery while simultaneously steaming another adsorber or group of adsorbers with a slight amount of superheat. The steam heats the carbon to 100 C, driving off the adsorbed solvent. The steam and solvent mixtures are then condensed and cooled, and the liquid formed separated into two phases: an upper layer that is rich in solvent and usually recycled and a lower layer rich in water and containing some solvent. This method is particularly suitable for recovery and recycling of lacquer solvents. Another installation described permits desorption vapors from the activated carbon process to be fed directly to a rectification plant and dehydrated. The procedure is recommended for the recovery of acetone, methanol, ethanol, and analgous solvents. In a lacquering installation with oven temperatures between 100 and 200 C, recycling of heat from the catalytic oxidation of exhaust air can improve the economics of the process. A flowsheet is given for an installation in which the heat is recovered and used in a hardening chamber and for space heating. Also illustrated is a catalytic unit for removing volatile hydrocarbons and mercaptans from 6000 cu m of exhaust gas.
APTIC-24755

CHEMICAL ENGINEERING METHODS FOR REMOVING INORGANIC EMISSIONS.

ACHEMA, Proceedings of a Symposium on the
Disposal of Process Wastes, Liquids, Solids,
Gases, Frankfurt au Main, West Germany, 1964,
p. 177-186. Also: DECHEMA Monograph Ser., 52
(895-911), 1964.
C. Scheidel.
Identifiers: *Dusts, *Control methods, *Sulfur oxides, Germany, Stack gases, Coal, Coke, Mineral processing, Primary metallurgical processing, Centrifugal separators, Electrostatic precipitators, Filters, Scrubbers, By-product recovery, Reinluft process (adsorption), Sulfuric acid, Sulfur compounds, Solids, Temperature.

Starting with known gas-purification processes (cyclones, scrubbers, filters, and electrostatic precipitators), a report is given on the current status of processes suitable for the precipitation of flue dust and inorganic solids in exit gases. Electrode design characteristics are compared, and the use of CS electrodes is shown to increase the collection efficiencies of electrostatic precipitators. Where electrostatic precipitators are impractical, excellent gas filtration is provided by a new gravel-bed filter. The gravel bed, which consists of quartz grains, is used in combination with a prefilter of metal or plastic wool. These filters are useful for temperatures up to 300 C and find application in mechanical processes such as the crushing, milling, and grinding of coals, ores, and minerals. Also described is the Reinluft activated coke process for removing sulfur oxides from waste gases. In this process, a moving bed of activated coke is conveyed downward in a tower housing an adsorber and a desorber section. Advantages of the process are that neither pretreatment nor dust removal is necessary and no liquids are involved. However, the residual gases rich in sulfur dioxide must still be converted to a solid or liquid sulfur compound. Activated coke is also used in the Sulfacid process for converting sulfur dioxide to sulfuric acid. In this process, the sulfuric acid formed by the adsorption of precooled and saturated gases in units packed with activated coke is washed out by spray nozzles mounted above the packing. To obtain a commercial grade of acid, any dust carried in the raw gases must be removed.
APTIC-24756

LEAD IN EXHAUST GASES.

For primary bibliographic entry see Field 04.
APTIC-24757

A REACTION WHICH PERMITS THE CYCLIC USE OF CALCINED DOLOMITE TO DESULFURIZE FUELS UNDERGOING GASIFICATION.

Am. Chem. Soc., Div. Fuel Chem. Preprints, 10
(4):20-40, Sept. 1966. 126 refs.
Arthur M. Squires.
Identifiers: *Gasification (synthesis), *Alkaline additives, *Thermodynamics, Stack gases, Fuels, Hydrogen, Carbon dioxide, Carbon monoxide, Heat transfer, Reaction kinetics, Reaction mechanisms.

Raw fluid fuels, derived for instance from coal and heavy residual oils by a variety of processes such as gasification, carbonization, or cracking, may be substantially desulfurized by reaction at high temperature with calcined dolomite. This solid can also remove carbon dioxide from a gas stream; it has the power to convert carbon monoxide and steam to hydrogen; and it may participate in the gasification of carbon by steam under a condition of thermal neutrality. The cyclic use of calcined dolomite for these purposes has previously been hampered by lack of means to recover elemental sulfur from sulfurized calcined dolomite, containing calcium sulfide, while at the same time recovering solid in a form suitable for reuse. Several improved desulfurization processes, such as the CO-shift process and the CO2 Acceptor Gasification Process, are described. These new fuel-desulfurization processes reject very little heat at low temperatures. If a fuel gas is to be used in a combustion, or if the gas is to be subjected to further processing at high temperature--CO-shift, for example--the new desulfurization processes have the advantage that the heat exchange required to cool the gases to a low-temperature sulfur-removal step is eliminated. The processes are well suited for use in schemes to produce a clean fuel gas to be burned at high pressure in an advanced power cycle. Power cycles which offer the prospect of a significant improvement in efficiency are the supercharged-boiler cycle, a cycle incorporating a magnetohydrodynamic device which 'tops' the steam cycle, and a top heat power cycle, in which the temperature of steam is raised by direct addition of the products of combustion of a clean fuel with oxygen or air. The ther-

modynamic equilibria which govern the new processes are discussed, the results of bench-scale studies are presented, the relevant dolomite chemistry is reviewed, and some potential applications of the methods are indicated.
APTIC-24762

AMMONIA PROCESS FOR REMOVAL OF SULFUR DIOXIDE FROM FLUE GAS.

In: Problems and Control of Air Pollution. F. S.
Mallette (ed.), New York, Reinhold, 1955, Chapt.
16, p. 170-190. 14 refs.
H. E. Newall.
Identifiers: *Absorption (general), *Ammonia, Great britain, Stack gases, Pilot plants, Scrubbers, Hydroxides, Nitrogen, Sulfates, Sulfites, Oxidation, Flow rates.

Operation of a pilot plant for the development of the Fulham-Simon-Carves desulfurization process and results obtained are described. Flue gas was scrubbed with a concentrated solution containing ammonium sulfite, bisulfite, sulfate and thiosulfate, and ammonia, in the form of crude concentrated gas-works liquor, was added at a rate corresponding to that of the absorption of the oxides of sulfur. A small amount of ferric hydroxide was present in the scrubber liquor to act as oxidation catalyst and to prevent the concentrations of ammonium sulfite and bisulfite rising unduly. The scrubber was 1 ft 6 in. in diameter and contained a wooden grid packing. The scrubbing liquor was circulated at the rate of 1100 gph/sq ft of cross section of the scrubber. The plant was controlled satisfactorily by the use of an instrument for recording the excess concentration of either sulfur dioxide or ammonia in air which had been in contact with the scrubber liquor. Equilibrium was reached in the scrubber at gas rates up to 23,000 cfh and with a depth of grid packing of 2 ft 6 in. or more. Efficiencies of removal of sulfur dioxide of about 80% were obtained with a loss of ammonia amounting to 15 to 20% by weight of the ammonia added to the scrubber. Measurements of the concentrations of sulfur dioxide and ammonia in nitrogen in equilibrium with solutions containing sulfate, thiosulfate, sulfite, and bisulfite gave the unexpected result that in the presence of high concentrations of ammonium sulfate or thiosulfate, the concentrations of sulfur dioxide in the gas phase in equilibrium with solutions of ammonium sulfite and bisulfite are several times higher than in the absence of these salts. The presence of ammonium sulfate and thiosulfate also increases the partial pressure of ammonia, an effect which was predicted from theory. If it is required to remove more than 80% of the oxides of sulfur in flue gas with little loss of ammonia, a higher rate of oxidation of sulfites must be achieved than was maintained in the scrubber. Even if such a rate of oxidation can be maintained, the marked effect of the ammonium sulfate produced in increasing the partial pressures of sulfur dioxide and ammonia may make it impossible, in a single-stage operation, to achieve an efficiency of removal of oxides of sulfur of more than 90%. Experiments were carried out to study a two-stage scrubbing process, using a dilute solution of ammonium salts in the second stage. Efficiencies of removal of oxides of sulfur of 95%, with a loss of ammonia in the washed gas of 3 to 8% of the ammonia added to the scrubber, were obtained with two-state scrubbing. (Author summary modified)
APTIC-24763

RESEARCH FINDINGS IN STANDARDS OF INCINERATOR DESIGN.

In: Problems and Control of Air Pollution. F. S.
Mallette (ed.), New York, Reinhold, 1955, Chapt.
10, p. 95-106. 6 refs.
Andrew H. Rose Jr., and Hoyt R. Crabaugh.
Identifiers: *Multiple chamber incinerators, *Design criteria, Operating variables, Overfire air, Mathematical analyses.

Two design parameters are developed for multiple-chamber incinerators; these parameters are emphasized because studies to date indicate that inferior performance and discharge characteristics occur when the design of the ignition chamber or primary combustion stage is inadequate. Data are given for combustion air distribution showing that where overfire air is the predominant means of supplying the required combustion air, the total discharge of contaminants to the atmosphere is decreased; the degree of reduction depends on the incinerator design. The type of ignition mechanism is independent of equipment size. Recent results support the hypothesis that discharge of 0-5 - micron particles results from chemical reaction and volatilization of metallic compounds present in the fuel bed with a condensation and chemical reaction occurring in the oxidizing gas stream above the fuel bed. Three relationships are considered with respect to ignition chamber proportions: grate loading, arch height, and length to width ration of the fuel bed. It is understood that lower arch height reduces contaminant discharge, but further data for definitive evaluation of all three factors are required.
APTIC-24767

INVESTIGATION OF THE PROCESSES OF MASS EXCHANGE AND CHEMOSORPTION IN ROTATION-TYPE EQUIPMENT.

(Issledovaniye protsessov massoobmena i
khemosorbtsii v apparate rotatsionnogo tipa). Text
in Russian. Teplo Massoperenos, vol. 4:84-92,
1966.
A. M. Nikolayev, R. Sh. Safin, and A. G. Karasev.
Identifiers: *Scrubbers, *Absorption, Usar, Stack gases, Mathematical analyses, Mathematical modeling, Sulfur dioxide.

A rotating device for decontaminating and separating industrial waste gases is described, and results from testing of a 0.4-m pilot model are reported and analyzed. This device is reported to have a high mass-transfer efficiency, high gas throughput, low resistance, and a chemosorption volumetric rate coefficient 3 times greater than for foam equipment and more than 4 times greater than for packed columns. A method for determining the increase in relative gas flow rate at rotor ring surfaces, based on generalized data from heat- and mass-exchange studies, is also presented. Generalization and modeling of chemosorption processes taking place in the diffusion region is also discussed, and it is shown that the coefficient of SO2 chemosorption rate may be estimated to within 15-20% using data for the humidification of air under the same conditions.
APTIC-24769

FINE FILTRATION OF PROCESS AND WASTE GASES FROM LEAD PRODUCTION WITH THE AID OF JET BLAST BAG FILTERS.

Tsvetn. Metal., 9 (6):51-56, June 1968.
V. Sh. Aizenberg, A. P. Gryazev, O. G.
Komissarov, V. P. Savraev, and B. A. Smirnov.
Identifiers: *Primary metallurgical processing, *Bag filters, *Filter fabrics, Usar, Dusts, Flow rates.

A compact, highly-efficient bag filter which operates at high flow rates is described. The filter differs from other designs in that cloth regeneration is effected with the aid of compressed air, blown over the cloth from a blast ring which moves along the filter bag. This filter is designed particularly for operation in non-ferrous metallurgical plants, where high levels of atmospheric dust are experienced and where recovery is an economic necessity. Since cloth regeneration is more efficient and does not interfere with the filtering process, the filters are equipped with a heavy multi-layer fabric, while the filtering rate may be increased considerably. Six novel filter designs incorporating the 'jet blast' regeneration method are described, and their applications are discussed. Tests conducted to determine optimum fabric material and weave are described, and the results are discussed in terms of sensitivity to pressure, temperature, efficiency, and operating life.
APTIC-24771

PROCEDURE FOR RECOVERING ELEMENTAL SULFUR FROM SULFUROUS GASES.

(Procede pour recuperer des gaz sulfureux le
soufre elementaire). Text in French. (William
Francis Lamoreaux) French Pat. 480,345. 6p.,
April 25, 1916. (Appl Nov. 29, 1915, 3 claims).
Personal Author Not Recorded.
Identifiers: *Reduction, *By-product recovery, *So2 removal (combustion products), Combustion gases, Coal, Design criteria, Sulfur compounds, Heat transfer.

Sulfur oxides are reduced to elemental sulfur by maintaining contact between the sulfur oxide and incandescent coal for a predetermined period of time, supplying enough additional heat to insure practically complete reduction of the sulfur oxide during the period of its contact with the coal. The equipment used for this procedure is designed in such a way as to utilize heat extracted from the gases emerging from the reduction chamber to supply at least part of the additional heat required for the process. Provision is also made to preheat the gases containing sulfur oxides before they enter the reduction chamber, using the heat derived from the gases from which sulfur has been extracted.
APTIC-24777

PROCEDURE FOR EXTRACTING AND CONCENTRATING SULFUROUS GASES.

(Procede d'extraction et de concentration du gaz
sulfureux). Text in French. (Societe Anonyme des
Manufactures des Glaces et Produits Chimiques
de Saint-Gobain, Chauny et Cirey, (France))
French Pat. 974,179. 1p., Jan. 9, 1952. (Appl. Dec.
27, 1940, 1 claim).
Personal Author Not Recorded.
Identifiers: *Quinones, *Beryllium compounds, *Alkaline additives, France, Combustion gases, So2 removal (combustion products), Sulfates.

The procedures for extracting and concentrating sulfur dioxide involves the introduction of small quantities of hydroquinone into the beryllium sulfate solution, or other basic beryllium salts in aqueous solution, which inhibits their oxidation and consequent loss of basicity. The amount added need be only one part hydroquinone to 10,000 parts of the solution.
APTIC-24778

SMOG CONTROL HELPS BAG MORE PROFITS.

Western Metalworking, 7 (6):21-23, June 1949.
Norman C. Brundage.
Identifiers: *Stack gases, *Primary metallurgical processing, *Bag filters, *By-product recovery, Smog, Smokes, Furnaces, By-products recovery, Gases.

Some smelters are complying with smog-control laws without financial loss by employing fiberglass bag filters to recover salable products from smoke. At one Los Angeles smelter, the amount of lead oxide recovered each day will pay for the plant's $30,000 baghouse in a year. The problem is different for ferrous plants, where there is no chance of profitable recovery. For these plants a satisfactory solution is to reuse furnace air to cut down on the cost of fuel. Usually the hot fume gases are cooled by passage through a heat exchanger, processed by a dust collector, and then reintroduced into the furnace.
APTIC-24782

THE SHARE OF AUTOMOBILE EXHAUST GASES IN AIR POLLUTION.

For primary bibliographic entry see Field 01.
APTIC-24783

IMPROVEMENT IN THE PROCESS OF PURIFYING FUMES AND GASES.

(Perfectionnement a l'operation des fumees et gaz). Text in French. (Societe Anonyme, Weiritam (France)) French Pat. 1,482,873. 3p. April 24, 1967. (Appl. Feb. 12, 1966, 6 claims).
Personal Author Not Recorded.
Identifiers: *So2 removal (combustion products), *Condensation, France, Combustion gases, Electric power production, Design criteria, Cooling, Water.

An aqueous solution of sulfur dioxide is obtained by condensation, on a cold wall, of water vapor contained in or added to the fumes or gases to be purified. The wall can be cooled by a heat exchange resulting from the circulation on the inner side of refrigerating fluids. In the case of fumes emitted by a heating plant, the heat recovered from this fluid can be transferred to a other point in the plant, where it can be used to supplement the heat production or to produce distilled water. When additional water vapor needs to be added to the fumes, this can be supplied in the form of a finely atomized water spray or in the form of steam. In the case of heating plants, after the removal of the aqueous condensation, the fumes can be reheated, possibly with the heat gained from the cooling process, so as to aid the dispersal of the exhaust gases when they reach the open air.
APTIC-24785

IMPROVED PROCEDURE FOR MANUFACTURING SULFUR.

(Procede perfectionne pour la preparation du soufre). Text in French. (Societe Nationale des Petroles d'Aquitaine, Paris (France)) French Pat. 1,440,027. 3p., April 18, 1966. (Appl. April 13, 1965, 6 claims).
Pierre Mathieu.
Identifiers: *Hydrogen sulfide, *By-product recovery, *So2 removal (combustion products), France, Combustion gases, Carbonates, Calcium compounds, Reduction, Water, Ph, Temperature.

Sulfur is obtained by a reaction between hydrogen sulfide and sulfur dioxide in an aqueous medium, the two gases reacting to form elemental sulfur and water. The improvement consists of obtaining this reaction at a temperature in the range of 45-65 C. This is done by keeping the temperature of the reaction environment as close as possible to 50 C. A neutralizing agent is added to the liquid separated from the sulfur after the first stage of the process, and this is reused in a later stage. The recycled liquid will have a pH greater than 6. Calcium carbonate or an insoluble base can be used as the neutralizing agent, while the aqueous medium can consist of a solution of electrolytes, notably sea water.
APTIC-24786

EFFECT OF SURFACE-ACTIVE AGENTS ON THE RATE OF ABSORPTION.

For primary bibliographic entry see Field 06.
APTIC-24790

RECOVERY OF REFINERY SULFUR IN AIR-POLLUTION CONTROL.

In: Problems and Control of Air Pollution. F. S. Mallette (ed.), New York, Reinhold, 1955, Chapt. 17, p. 191-201. 2 refs.
George E. Smalley, and James W. Klohr.
Identifiers: *Petroleum refining, *By-product recovery, *Hydrogen sulfide, County governments, Regulations, Los angeles, Stack gases, Operating variables, Vapor recovery systems, So2 removal (combustion products), Sulfur compounds, Catalysts, Reduction.

Several aspects of operating the plants which recover sulfur from sour gases at petroleum refineries are discussed; this recovered sulfur represents a significant amount of sulfur dioxide which would otherwise be released to the atmosphere. The process by which hydrogen sulfide is converted to sulfur is based on a controlled combustion with air in which a third of the H2S is burned to form SO2 which reacts with the remaining two-thirds of the H2S to form sulfur and water vapor. The sulfur vapor is condensed and recovered as liquid sulfur. One problem is the effect of the inverse viscosity of sulfur in the design of liquid-sulfur handling system. Experience shows that with careful design, a sufficient concentration of H2S can be maintained in order to maintain reduced viscosities where necessary. The control of the initial ratio of H2S to SO2 as near as possible to the exact stoichiometric ratio of two volumes of H2S to one of SO2 is important for maximum conversion and minimum discharge of sulfur compounds to the atmosphere. A gas-fired incinerator is installed to convert the residual H2S and other sulfur compounds to SO2. The effluent gases are emitted to the atmosphere at a high temperature to help in dispersing the SO2. A recent change in Los Angeles County permits operation of these plants even where their effluent exceeds maximum permissible SO2 emissions, since their operation materially reduces the overall quantity of sulfur compounds released to the atmosphere, in addition to providing an additional source of industrial sulfur.
APTIC-24792

SEPARATION OF SMALL PARTICLES FROM AIR IN A SIEVE PLATE COLUMN.

Pennsylvania State Univ., University Park, Dept. of Chemical Engineering, Thesis (Ph.D.), Ann Arbor, Mich., Univ. Microfilms, Inc., 1967, 121p. 42 refs.
Mansoor Taheri.
Identifiers: *Sieve plate columns, Aerosols, Particle size, Collectors, Bubble towers, Inertial separation, Design criteria, Mathematical modeling, Flow rates, Hygroscopicity.

An investigation of particle behavior in a more complex case, foam or froth generated in a sieve plate column, was undertaken in order to explore the possibilities of using this system for removing small particles from air. The basic apparatus chosen for this study was a sieve plate column with overflow weirs, while dynamic foam or froth was generated by bubbling air through a layer of liquid. The method adapted was that of establishing a mathematical model based upon measurable physical parameters which would be capable of accounting for important parameters in particle collection and which would predict the efficiency of the sieve plate column. The sieve plate column is capable of providing a fairly high collection efficiency for particles above 2.0 micron at low pressure drop. Particle collection can be defined in terms of a combination of an inertial model and a diffusional model. Perforation diameter and air flow rate do not have a very significant effect on collection efficiency. The collection efficiency for a hydrophobic aerosol is considerably lower than the collection efficiency for a hydrophilic aerosol. However, the collection efficiency for a hydrophilic aerosol can be predicted with some modification based on the models provided.
APTIC-24793

ANALYSES OF SPACE-CHARGE PRECIPITATION.

California Univ., Berkeley, Dept. of Chemical Engineering, Thesis (Ph.D.), Ann Arbor, Mich., Univ. Microfilms, Inc., 1967, 231p. 18 refs.
Larry Eugene Faith.
Identifiers: *Electrostatic precipitators, *Mathematical modeling, Particle size, Fluid flow, Electric charge, Corona.

Precipitation of charged particles by their own space-charge is investigated both theoretically and experimentally. Mathematical models are developed for the precipitation of charged particles from a gas moving through a cylindrical precipitator. The first two models predict the precipitation of uniform size particles under plug-flow and turbulent flow conditions. The plug-flow model is one dimensional and is solved exactly, while the turbulent flow model is two dimensional and requires numerical techniques for solution. Two other models extend the above models to the precipitation of a particulate mixture having a distribution of particle diameter and charge. The plug-flow extension is solved numerically by the Runge-Kutta-Gill integration, and the turbulent flow extension is solved by an iterative technique. In the experimental runs, charged particles were precipitated from a moving air stream in wetted-wall columns of 2-inch diameter and various lengths. The particles were 100 micron in diameter glass beads and were charged in the field of a corona discharge. Particle concentrations calculated from weighed samples varied from 7.53 particles/cu cm at the initial point down to 0.48 particles/cu cm at the end of the longest column. Experiments were performed at a Reynolds number of approximately 5000 for the air and at air retention times from 0.070 to 0.432 sec. Comparison of calculated results for the plug-flow and turbulent flow models with both uniform and multiple size particles demonstrates that precipitation rates are only slightly lower in turbulent flow. Hence, the plug-flow model predicts reasonable values for the fraction of particles unprecipitated and with much less effort than the turbulent flow model. (Author abstract)
APTIC-24794

DYNAMICS OF A GAS ABSORPTION COLUMN.

Purdue Univ., Lafayette, Ind., Dept. of Chemical Engineering, Thesis (Ph.D.), Ann Arbor, Mich., Univ. Microfilms, Inc., 1967, 158p. 31 refs.
Noel Edward Moore.
Identifiers: *Bubble towers, *Mathematical modeling, Absorption, Computer programs, Simulation, Sulfur dioxide, Oxygen, Flow rates, Water.

An investigation was undertaken to determine a model of a small bubble-cap absorption column, suitable for use in process control work. Using an eight inch bubble-cap column, experimental measurements were made for the system air-sulfur dioxide-water, while the input and output variables considered were gas concentration, liquid concentration, gas flow rate, and liquid flow rate. Computer programs accepted data taken from the recorded curves and searched to find the optimum values of time constants and time delays, based on a least-squares fit. The time constants and time delays were used in a transfer matrix, each element of which was a transfer function relating one output variable to one input variable. Gains of the elements in the transfer matrix were determined by a multiple regression analysis of the total deviations of the output and input variables. Each gain was assumed to be a linear function of the liquid and gas flow rates. Another model, called the 'analytical model', was developed by a more conventional analysis of the unsteady-state material balance equation augmented by considerations of equilibrium, efficiency, liquid dynamics, and mixing on a plate. The two models were used to simulate a one-plate column and the results were compared with the experimental results. In every case, the matrix model provided the best fit with experimental data. The matrix model was then used to simulate each plate of a column with three plates. There was an error in predicting the total deviation in liquid concentration which varied from approximately 2% for the bottom plate to 22% for the top plate. (Author abstract)
APTIC-24798

HEAT TRANSFER AND OTHER EFFECTS OF AN ELECTRIC FIELD ON A PARALLEL FLOW HYDROCARBON DIFFUSION FLAME.

For primary bibliographic entry see Field 06.
APTIC-24800

DRY FIBROUS AIR FILTER MEDIA. PERFORMANCE CHARACTERISTICS.

Ind. Eng. Chem., 43 (6):1346-1350, June 1951.

Earl Stafford, and Walter J. Smith.
Identifiers: *Filter fabrics, *Design criteria, Asbestos, Aerosols, Dusts, Particle size, Glass fabrics, Flow rates, Permeability.

There are two kinds of low resistance media available for high efficiency filtering: the first, which so far is the better, is a thin paperlike asbestos bearing sheet; the second consists of relatively thick pads or mats of very fine glass fiber. Another type is a loosely formed pad which is a mixture of wool and finely divided resins having a static charge. These filters, though high in efficiency on dry dust, lose their charge when subjected to liquid aerosols, and efficiency then becomes low. To make a good filter of the first type depends on dispersing the fine asbestos uniformly through the sheet in such a way that the cellulose forms a coarse lattice; across the openings of the lattice fine filaments span in an evenly dispersed, unclotted formation. Glass fiber media are padlike sheets from 0.5 to 1 inch or more in thickness of fine, loosely arranged filaments. For strength in handling, the fibers are bonded with light applications of a resin incorporated when the mat is formed. A special advantage of glass fiber filters is that they are fireproof. For the moderately low velocities used in air filtration, the resistance to flow bears a straight-line relationship to velocity. However, filtering efficiency, which varies with velocity, is further modified by the turbulence factor in the flow through sheets with pinholes. To study this effect, test sheets with artificially made pinholes or needle pricks were examined. Flow rate, resistance, and efficiency are compared for various filter media against atmospheric dust and oily aerosols.
APTIC-24802

IMPROVING THE GAS CLEANING ON 100 T OXYGEN CONVERTERS.

Steel (USSR) (English translation from Russian of: Stal'), no. 6: 495-496, 1970. 2 refs.
V. O. Kulikov, A. E. Prikhozhenko, and N. G. Braginets.
Identifiers: *Oxygen converters, *Scrubbers, *Design criteria, Steel, Dusts, Ussr, Furnaces, Primary metallurgical processing.

The original gas-cleaning system for 130-133 ton oxygen converters provided for primary cleaning in 90-96 venturi tubes, each having a throat diameter of 90 m, and final cleaning in foam plates. The system was characterized by high moisture loss and deposition of sludge on fan rotors and in venturi tube atomizers. As a result, the average residual dust content amounted to 200-250 mg/cu m. By reducing the number of tubes to 18, increasing their throat diameter to 22 mm, and adopting evolute atomizers, residual dust content was reduced to 85-120 mg/cu m.
APTIC-24809

PLANT SERVICES BEAT EXPLOSION HAZARDS.

Mod. Power Eng., 64 (11): 40-44, Nov. 1970.
Personal Author Not Recorded.
Identifiers: *Flour processing, *Bag filters, *Ventilation, *Dusts, Explosions, Air conditioning equipment, Odor counteraction, Design criteria.

Modern air conditioning and dust control techniques in a Canadian flour mill have produced a virtually dust-free atmosphere and drastically reduced the need for explosion-proof electrical equipment. In addition, dry-cleaning of raw wheat grains, as opposed to water washing, has eliminated odors. The dust collection system comprises five separate systems, each using bag filters. In the cleaning section, the dust collector aspirates all receivers on intermediate relift conveyors and the screenings section conveyor. In addition, all cleaning machinery, feeders, and screw conveyors in the cleaning section are aspirated through this filter. Clean exhaust air from this and the other filters is fed to an air make-up unit which creates a positive air pressure within the mill and prevents the build-up of dangerous dust concentrations.
APTIC-24810

TURBINE-POWERED BUSES. HOW GAS TURBINES WORK.

Motor Coach Age, 22 (7):6-14, July 1970.
Personal Author Not Recorded.
Identifiers: *Gas turbines, *Buses, Costs, Ceramics, Engine exhausts, Operating variables, Jet aircraft, Internal combustion engines, Automobiles, Automotive emission control, Design criteria, Hydrocarbons, Carbon monoxide, Nitrogen oxides, Heat transfer.

Fundamental principles of the gas turbine engine are discussed, as well as its development for automotive use and its application to power buses. At the present time, the most important employment of the gas turbine is in aviation, where it serves as a jet propulsion unit; the turbofan engine produces significantly greater thrust without a concomitant cost in fuel, and in level flight there is even some fuel economy as compared with the conventional jet engine. The Rover Co. in England began working on a gas turbine for automotive use as early as 1945, and the first experimental auto was tested in March 1950. British Leyland Motors Corp., General Motors, and Ford are concentrating at present on large turbines suitable for buses and heavy trucks, while Chrysler's effort is principally directed at small automobile powerplants. The key to simplifying a gas turbine for mass production and for automotive use is a device known as a regenerator, the purpose of which is to extract heat from the exhaust flow and use it to warm the air being delivered from the combustion chamber to the compressor. At a given inlet temperature, a 100% effective heat exchanger would reduce fuel consumption by 50%, compared to an engine without a heat exchanger. All regenerators of which any information is known today are made of ceramic materials that have very low thermal expansion rates, so that the sealing problem between the hot and cold sides is essentially solved. The turn away from metals began in 1962, when Corning Glass put on the market a glass ceramic material called Cercor, but experimentation showed that its operating temperature limitation was around 1000 C. Leyland is using silicon nitride today for turbine blades, combustion weight, and cost factors are presented tabularly for internal combustion and gas turbine engines. Schematic drawings illustrate the air flow path through the major components of a gas turbine engine, with differences depicted between the GM turbine and the Ford and Leyland engines. According to recent announcements, Detroit Diesel will offer a 280-hp version on a limited basis during 1971, and it is now being tested in a Greyhound MC-7. Ford has as yet said nothing about whether the 707 engine (450 hp), as demonstrated late last year in a Trailways bus, will be marketed in its present form.
APTIC-24811

METHOD TO REMOVE SULFUR DIOXIDE FROM ATMOSPHERIC AIR OR WASTE GAS.

(Taiki matawa hai gasu chu no aryusan gasu o jokyo suru hoko). Text in Japanese. (Mitsui Petrochemical Industries, Ltd. (Japan), Japan. Pat. Sho 45-17765. 3p., June 18, 1970. 1 ref. (Appl. Aug. 26, 1966, claims not given).
Hirotoshi Tsuchida.
Identifiers: *Ethylene glycol, *Absorption (general), Japan, Combustion gases, Alcohols, Carbonates, Calcium compounds, Oxygen, Density.

Based on the finding that ethylene glycol readily absorbs sulfur dioxide and that the ethylene glycol can be easily regenerated by contacting it with calcium carbonate, a method was devised in which SO2 can effectively and simply be removed in extremely small quantities from atmospheric air or waste gases. When air is utilized for chemical reactions or similar purposes, and if it contains SO2, it not only causes corrosion of the blower or duct pipes but also interferes with the chemical reaction, however little it may exist therein. It is also undesirable from the viewpoint of public hygiene to discharge into the atmosphere waste gases containing SO2. Although there is almost no limit to the density of SO2 content, this method can handle, when the density is too high, not only a large amount of ethylene glycol is required but als the regeneration efficiency by means of calcium carbonate falls down. For this reason, this method is most suited for removal of SO2 when its density in atmospheric air or waste gas is 5 ppm or lower. Another prerequisite is that there must be oxygen in the gas containing SO2.
APTIC-24812

EMISSION AND PERFORMANCE OF GASOLINE ENGINE.

For primary bibliographic entry see Field 01.
APTIC-24813

MANUFACTURING METHOD FOR SULFUR DIOXIDE ABSORBENT.

(Aryusan gasu kyushuzai no seizoho). Text in Japanese. (Tokyo Activated Clay Co., Ltd., Itoigawa (Japan)) Japan. Pat. Sho. 45-18977. 4p., June 29, 1970. 3 refs. (Appl. Aug. 31, 1966, claims not given).
Shigeru Mizuno.
Identifiers: *Clay, *Absorption (general), Japan, Combustion gases, Hydroxides, Barium compounds, Calcium compounds, Magnesium compounds, Temperature.

In a new method devised for the manufacture of sulfur dioxide absorbing agent, one or more of alkaline earth metal hydroxide in 30-80% weight ratio is mixed with a clay in 10-50% weight ratio. An alkaline metal hydroxide in 10-40% weight ratio is dissolved in water to make a solution which is added to the above described mixture. The product is then heated at 60-110 C, whereby it is reduced to a slurrylike reactive material which is further heated at 100-300 C. Use of clay provides an absorbing agent far superior to that obtained by mixing an alkaline earth metal hydroxide such as calcium hydroxide, magnesium hydroxide, or barium hydroxide with an alkaline metal hydroxide such as sodium hydroxide or potassium hydroxide. Manufactured by this newly invented method, the absorbent comes in solid form mechanically strong enough to ensure against being powdered. Of the various kinds of clay found suitable for use, acid kaolin or china clay is recommended while the best suited of the alkaine metal hydroxides is calcium hydroxide, magnesium hydroxide, or barium hydroxide.
APTIC-24815

GAS CLEANING BY MECHANICAL SEPARATION.

Gas, 46 (11):61-66, Nov. 1970. 11 refs. (Presented at the Gulf Coast Measurement Short Course, Houston, Tex., Sept. 1970.)
M. M. Valerius.
Identifiers: *Control equipment, *Design criteria, Droplets, Mists, Natural gas, Particle size, Impingers, Centrifugal separators, Settling chambers, Filters, Gravity settling, Compressed gases, Liquids, Solids.

Gas pipeline contaminants can be described as either liquid or solid, and can be range in size from sub-micron particles to substantial chunks of corrosion products. A multitude of separator designs are required to solve the problem of efficient gas cleaning. The separation mechanisms involved, usually in a cylindrical pressure vessel envelope, are impingement, gravity settling, centrifugal separation, filtration, and coalescing. By employing internal mechanical design to implement an appropriate combination of these mechanisms, it is possible to 'tailor' a gas cleaning vessel to suit almost any specific application. Representative mechanical designs based on the five separation principles are illustrated. Impingement, as applied to mist extraction, is best suited to remove light to moderate quantitites of liquid droplets in the range

of 3 to 125 micron. The simplest of all separation mechanisms is the open gravity segregation chamber. Effective centrifugal separators must induce high gas stream angular velocities for appreciable time duration without excessive turbulence. The cartridge filter is widely used where high efficiency solids removal to micron size particles is desired.
APTIC-24816

FORMATION AND THEIR PREVENTION OF ACID SMUTS AT OIL FIRED BOILER.

(Juyu nensho ni yoru asiddo sumatto no hassei to sono boshi taisaku). Text in Japanese. Nenryo Kyokaishi (J. Fuel Soc. Japan, Tokyo), 49 (521):656-665, Sept. 20, 1970. 7 refs.
Kinji Hoshizawa, and Kazuo Koyata.
Identifiers: *Acid smuts, *Steam plants, *Excess air, Japan, Stack gases, Dusts, Natural gas, Fuel oils, Stacks, Alkaline additives, Dispersion, Sulfuric acid, Sulfur trioxide, Compressed gases.

The capacity of thermal electrical generation in Japan recently reached 27,600,000 kw, or 10 times the 1951 figure. This was accomplished with 26 million tons of coal and 19 million kl of heavy oil. The capacity of a single generator has increased also to about 350-600 mw. The use of heavy oil is expected to reach 35 million kl in 1971, and 500 million kl in 1975. The sulfur content of the fuel is about 2%, requiring stacks as high as 200 m to disperse the gas. Some power stations have changed to liquefied natural gas. If this contains sulfur, however, acid smuts are formed by the combination of dust and sulfur trioxide gas. Field tests indicated that the smuts were mainly formed in the stack and fell within 400 m from the stack in conditions of light wind. Full load conditions and load up periods were critical in terms of smut emissions, which increased with increased excess air. Three methods of prevention tried against acid smut emissions were to maintain minimum excess oxygen under 1.0% in order to decrease the acid dewpoint below the flue gas temperature; to neutralize SO3 by means of ammonia injection of over 0.04% by weight of fuel oils; and elimination of dust, which does reduce the smut problem. Although measures have been taken to prevent air pollution, little has been learned regarding the formation mechanism of acid smuts.
APTIC-24817

ADSORPTION DESULFURIZATION METHOD FOR GASEOUS SUBSTANCES CONTAINING HYDROGEN SULFIDE.

(Ryuka suiso o fukumu gasujobutsu no kyuchaku datsuryuho). Text in Japanese. (Japan Gasoline Co.) Japan. Pat. Sho 45-11785. 4p., June 18, 1970. 2 refs. (Appl. April 27, 1966, claims not given).
Akizo Ono, Toshihiro Ueno, and Tadashi Sugiyama.
Identifiers: *Adsorption, *Hydrogen sulfide, Chromium, Nickel, Japan, Stack gases, Crystal structure.

Gas at room temperature or higher that contains hydrogen sulfide can be efficiently and economically desulfurized by means of a new adsorption agent made of laterite. Compared with conventional adsorption agents made from iron oxide materials now widely used for desulfurization, the laterite agent features much greater quantitative equilibrium characteristics. Therefore it is capable of desulfurizing practically completely a comparatively large amount of contaminated gas without the necessity of stopping to replace the adsorption agent. Why laterite possesses such a high H2S adsorption power is not theoretically clarified as yet, but it may be due to the nickel and chromium constituents and their crystal structure. Laterite is composed of 45-55% iron; 1.5-3% chromium; 0.2-1.3% nickel; 0.1-0.7% manganese; 0.02-0.15% cobalt; 1-15% silicon dioxide; 2-10% aluminum oxide; 0.2-5% magnesium oxide; and 6-15% water of crystallization. Tested under the same conditions, laterite adsorbed twice as much H2S (as sulfur) as another leading adsorbent did.
APTIC-24818

DISPOSAL OF FUMES FROM PVC DURING COPPER RECOVERY.

Soc. Chem. Ind. (London) Chem. Eng. Group Proc., vol. 46:59-61, 1967-68. (Presented at a Society of Chemical Industry, Chemical Engineering Group Symposium, March 12, 1968.)
I. Burridge.
Identifiers: *Polyvinyl chloride, *Fumes, *Metal fabricating and finishing, *Control methods, Copper, Great britain, Smokes, Oil burners, Collectors, Scrubbers, Spray towers, Venturi scrubbers, Absorption, Design criteria, Hydrochloric acid, Chlorinated hydrocarbons, Cooling.

While there are numerous sources of scrap copper and as many systems of recovery, this paper deals with the disposal of fume following the recovery of copper cable covered with polyvinyl chloride. An oil fired furnace was designed specifically for the purpose of burning off the PVC and incorporates a separate smoke chamber through which all products of combustion pass, thereby using up waste heat to reduce smoke. An absorption system is also incorporated with the furnace to accommodate the hydrogen chloride gas which would otherwise be discharged to the atmosphere. Gases from the furnace are vented directly into a Keebuch cooling column. Four spray jets continually spray the gas with water as it passes down the column, while a weir at the top allows a constant film of water to pass over the walls of the column to protect them against the initial high temperature of the gas. The gases are passed into the main scrubbing and neutralizing system from the cooling column. An intimate mixture of liquor and gas is drawn up a venturi under considerable turbulence and it is at this point that the absorption of the gas by the liquor takes place. The liquor and gas mixture is discharged through the impeller against the walls of the vessel and the cyclonic motion imparted by the impeller assists in the separation of liquor from the gas. Further details and precautions are indicated.
APTIC-24819

GAS PURIFICATION DEVICE.

(Gasu seijo hoho). Text in Japanese. (Hitachi, Ltd., Tokyo (Japan)) Japan. Pat. Sho 45-16081. 2p., June 4, 1970. 2 refs. (Appl. Aug. 6, 1965, claims not given).
Zensuke Tamura.
Identifiers: *Adsorption (general), Continuous, Japan, Stack gases, Boilers, Scrubbers, Alkaline additives, Sulfur trioxide, Condensation, Drying.

A control device designed to remove water soluble gases such as sulfur dioxide and sulfur trioxide contained in combustion exhaust gas discharged from a boiler or furnace is described. Numerous small sealed packs of cold water or small pieces of cooled material dropped into the exhaust gas first condense the water content in the gas and then adsorb the water soluble gases with the condensed water on their surfaces, thereby removing the water soluble gases from the exhaust gas. From this basic method is developed another in which the used packs or pieces of cooled material are neutralized, washed, dried, and fed into the gas purification tank again for continuous cycles of the purification process. An exhaust or waste gas purification device of this system designed for use with exhaust gas from a boiler consists mainly of a purification tower, a detachable alkaline solution tank provided under the tower, a washing/cooling tank, and a drier. Numerous sealed packs of cold water or pieces of cooled material are dropped into the tower full of the exhaust gas, where they condense the water content in the gas and adsorb SO2 and SO3 into the water so condensed on their surfaces as they fall down through the tower into the alkaline solution tank where they will be neutralized. They are then led into the washing/cooling tank in which they are washed and cooled with cool water. From there, they are lifted up into a dryer where they are dried and further elevated above the tower and put into the tower again for another cycle of the purification process.
APTIC-24821

ENGINE EXHAUST GAS PURIFICATION DEVICE.

(Enjin no haiki gasu joka sochi). Text in Japanese. (Mitsubishi Heavy Industries, Ltd., Tokyo, (Japan)) Japan. Pat. Sho 45-15766. 3p., June 2, 1970. (Appl. Sept. 28, 1966, claims not given).
Tadayuki Hashimoto.
Identifiers: *Engine exhausts, *Catalytic afterburners, *Automotive emission control, Japan, Spark ignition engines, Automobiles, Hydrocarbons, Carbon monoxide, Catalytic activity, Heat transfer, Temperature.

A catalytic-type exhaust gas control device for automobiles is described. An important criterion of catalytic devices is the starting characteristic, or the time required for effective operation to be reached. There are many factors which affect the starting characteristic, but the most important one in terms of achieving better results is the prevention of heat radiation from the catalyzer burning section. Hydrocarbons and carbon monoxide emissions in a two-cycle engine peak as they reach their highest output with the accelerator fully open. For a catalyst unit directly connected to the engine, this means that exhaust gas temperatures often reach 1200 C, which causes rapid deterioration of the catalyst. In the device described, the catalyzer section is surrounded with an air chamber so that heat radiation from the catalyst burning section is prevented to improve the starting characteristic, while at the time of high power output, fresh air is taken into the air chamber to prevent excessive heat loading and therefore reduce catalyst deterioration.
APTIC-24822

EXHAUST GAS PURIFICATION DEVICE FOR AUTOMOTIVE INTERNAL COMBUSTION ENGINE.

(Jidoshayo nainenkinan no haiki joka sochi). Text in Japanese. (Daihatsu Kogyo, Ltd., (Japan)) Japan. Pat. Sho 45-15765. 3p., June 2, 1970. (Appl. Sept. 21, 1966, claims not given).
Takashi Kobayakawa.
Identifiers: *Catalytic afterburners, *Air-fuel ratio, Japan, Engine exhausts, Engine operating cycles, Spark ignition engines, Automobiles, Catalytic oxidation, Design criteria, Carbon monoxide, Catalytic activity, Temperature.

An automotive exhaust gas purification system which oxidizes unburnt exhaust gas by means of a catalyst is described. It is designed to prevent the catalyst temperature from falling below the lowest limit allowable for effective catalyst reaction, especially during low-speed or idling operations when there is practically no load on the engine. Harmful exhaust components, particularly carbon monoxide, increase during idling, while exhaust gas temperatures drop to as low as 80 C at the entrance to the catalytic control device. Since the optimum reaction temperature for the popular white gold catalyst is about 300 C, the exhaust gas must be maintained at a higher temperature than 80 C or no reaction would occur. This is accomplished by utilizing a variable control valve in conjunction with a fuel intake system to raise the engines rpm's when necessary, thus maintaining proper operating exhaust gas temperature.
APTIC-24823

DEVELOPMENT OF HIGH SPEED BURNER.

(Hai supido bana no kaihatsu). Text in Japanese. Nenryo Kyokaishi (J. Fuel Soc. Japan, Tokyo), 49 (521):683-692, Sept. 20, 1970.
Kazuo Yamagishi, Yasuo Kakegawa, and Hirobumi Iida.
Identifiers: *Fuels, *Furnaces, Japan, Combustion gases, Natural gas, Fuel oils, Electric furnaces, Oil burners, Fluid flow, Convection, Compressed gases.

Despite rapid progress in industrial technology, heating processes seem to be slower in development speed than cold processes. Rather than heavy oil, city gas for industrial use has been taken up recently, and studies on its technical develop-

ment were made to increase its competitive aspects, since its position was kept to to low before because of per calorific unit price. Heat transfer in industrial furnaces is conducted mainly by radiation and convection. In industrial furnaces, particularly in the oil fueled and electrically heated furnaces, radioactive heat transfer is predominant. For the purpose of realizing more efficient heating, it is necessary to make effective use of convective heat transfer. High speed burners which have the ability to effuse high temperature combustion product at high speeds have been developed. The high speed burner supplies not only heat but also mechanical energy in the form of a jet gas stream into the furnace. This jet stream causes violent recirculative flow of hot gases, which is of great use to obtain rapid, uniform heating, and thermal efficiency improvement. The fundamental structure of the high speed burner and the hydrodynamic characteristics of its high speed hot gas stream are briefly described, and the results of actual applications are also referred to. The merit of convective heating is best exercised with the combination of such good quality gas as city gas and the high speed burner, producing better results than other heating methods. In a quarter century from now, it will be an age of gas, and liquefied natural gas, without any pollutants, will be introduced in great quantity to replace oil as important industrial energy. With the use of the high speed burner, this energy will prove to be even more advantageous.
APTIC-24824

PROBLEMS SET BY ATMOSPHERIC POLLUTION IN JAPAN.
For primary bibliographic entry see Field 01.
APTIC-24826

COSTS OF CONTROLLING GRAY IRON CUPOLA EMISSIONS.
For primary bibliographic entry see Field 10.
APTIC-24827

LEADED OR NON-LEADED GASOLINE...WHAT ARE THE FACTS"
Ethyl, no. 2:4-10, 1970.
Personal Author Not Recorded.
Identifiers: *Automotive emissions, *Gasolines, *Fuel additives, *Lead compounds, Costs, Automobiles, Engine operation modification, Air-fuel ratio, Phenols, Aldehydes, Hydrocarbons, Polynuclear compounds.

The change from leaded to unleaded gasoline will not reduce hydrocarbon emissions, improve the particulate loading of the atmosphere, or make exhaust catalysts less prone to attrition and loss. By exposing millions of cars to excessive exhaust valve seat wear, unleaded gasoline will bring about a sevenfold increase in exhaust emissions. Increasing the aromatic content of unleaded gasoline to achieve antiknock quality equivalent to that of leaded gasoline will specifically increase emissions of hazardous polynuclear aromatic hydrocarbons, phenols, and aldehydes, which participate in photochemical smog reactions. To produce unleaded gasoline meeting 91-octane requirements will increase refining costs by ten million dollars (5.17 cents a gallon). One alternative to unleaded gasoline is the lean reactor approach developed by the Ethyl Corporation. Very low emissions are achieved in a lean reactor car through significant improvements in the induction, ignition, and exhaust systems. With this car it should be possible to meet gaseous emission levels that have been proposed for 1975.
APTIC-24829

NEW WAY TO DESULFURIZE RESIDS.
Hydrocarbon Process, 49 (11):187-191, Nov. 1970. 7 refs. (Presented at the American Chemical Society Meeting, 160th, Paper 34.)
H. D. Radford, and R. G. Rigg.
Identifiers: *Residual oils, *Pilot plants, *Hydrodesulfurization, Costs, Petroleum refining, Desulfurization of fuels, Catalysts.

New York City now specifies a one percent maximum allowable sulfur concentration for fuels, and similar restrictions have been, or will be, adopted in other metropolitan areas. Pilot plant data is presented for a new fixed-bed catalytic hydrodesulfurization process capable of reducing the sulfur content of residual oils to the required level. The process uses a proprietary catalyst that resists poisoning by sulfur, nitrogen, metals, coke-forming materials and other troublesome constituents of the oils. Sustained operation was demonstrated in reactors varying in capacity from 20 to 250 cc of catalyst. In general, the catalyst life should be in excess of one year for the desulfurization of high-gravity, low-viscosity materials and at least six months for a highly viscous material. The capital investment required for the process, together with processing costs, depend on the feedstock processed and the size of the reactor required. It is noted that the process is still relatively expensive by petroleum processing standards.
APTIC-24830

ROTATING CENTRIFUGAL SEPARATOR WITH CONTINUOUS DUST DISCHARGE.
(Rotierender Zentrifugalabscheider mit kontinuierlicher Staubableitung). Text in German.
Staub, Reinhaltung Luft, 30 (9):366-370, Sept. 1970.
Karel Budinsky.
Identifiers: *Centrifugal separators, *Design criteria, Continuous, Czechoslovakia, Dusts, Operating variables, Mathematical analyses.

The design, mode of operation, and calculation of a rotating centrifugal separator with continuous dust discharge are described. According to the form of the vortex rotor, there are three modifications of the separator. The movement of particles in the field of force of the vortex rotor is calculated and formulae are derived for calculating the fractional separation efficiency, and further parameters of the separator. An example is given of the calculation of a centrifugal seperator.
APTIC-24831

TWO-STAGE MIST ELIMINATORS FOR SULFURIC ACID PLANTS.
Chem. Eng. Progr., 66 (11):67-72, Nov. 1970. 5 refs.
Otto H. York, and E. W. Poppele.
Identifiers: *Mists, *Scrubbers, *Sulfuric acid, Regulations, Acid smuts, Stack gases, Chemical processing, Particle size, Absorption.

Sulfuric acid plants, and plants producing oleum in addition to sulfuric acid, are a major source of concern to air pollution authorities because of the dense and highly corrosive acid mist discharged with the absorption tower tail gas. Modern air pollution codes require that mist emissions from existing plants be reduced to below 2 mg/std cu ft. Compliance with these regulations is achieved at minimum cost by means of a two-stage scrubber, one stage designed for the removal of the coarse fraction of the mist and the other for removal of very fine mist particles. Fluorocarbon fibers are used for the contact stages as they combine complete corrosion resistance with high separation efficiency at moderate pressure drop. Efficiency of the scrubbers, unlike that of two-stage wire mesh mist eliminators, is essentially 100% for particles down to about one micron. Reduction of particles down to 0.3 micron is also substantial.
APTIC-24833

FLUORIDE RECOVERY FROM PHOSPHORUS PRODUCTION.
Chem. Eng. Progr., 66 (11):56-62, Nov. 1970. 9 refs.
J. C. Barber, and T. D. Farr.
Identifiers: *Spray towers, *By-product recovery, *Fluorine compounds, *Phosphates, Stack gases, Mineral processing, Scrubbers, Absorption, Design criteria, Hydrofluoric acid, Ammonium compounds, Fluorides, Iron oxides, Silicon dioxide, Ph.

When phosphate rock is processed to make various phosphate chemicals, fluorine in the rock is evolved as gaseous hydrogen fluoride, silicon tetrafluoride, or a mixture of these gases. Substantially all the fluorine must be removed to comply with Federal, state, and local pollution abatement regulations. TVA studies of fluorine recovery revealed that fluorine compounds can be readily removed by scrubbing the gases with slightly acidic aqueous ammonium fluoride. The hydrogen fluoride dissolves and reacts with ammonia in the aqueous solution to form ammonium fluoride. The silicon tetrafluoride dissolves in aqueous ammonium fluoride to form a solution of ammonium fluosilicate. Silicon and iron compounds are removed from the ammonium fluoride-ammonium fluosilicate scrubber liquors by adding ammonia to raise the pH to 8-9; the fluosilicate decomposes, and precipitates of hydrated silica and iron hydroxide are separated from the ammonium fluoride solution. The silicon and iron contents of the filtrate will correspond to weight ratios $F:SiO_2$ and $F:Fe_2O_3$ well above the minimum values specified by the aluminum industry for cryolite and aluminum fluoride.
APTIC-24834

CONTROL OF POWER PLANT EMISSIONS.
Chem. Eng. Progr., 66 (11):49-54, Nov. 1970. 35 refs.
G. C. Wiedersum Jr.
Identifiers: *Fuel oils, *Electric power production, *Operating variables, Stack gases, Fly ash, Smokes, Boilers, Potentiometric methods, Chromatography, Colorimetry, Monitoring, Electrostatic precipitators, Bag filters, Scrubbers, Catalytic oxidation, So_2 removal (combustion products), Adsorption (general), Alkalized alumina (adsorption), Reinluft process (adsorption), Infrared spectrometry, Ultraviolet spectrometry, Nitrogen oxides, Light scattering.

Changing boiler fuel from coal to oil (1% and 2% sulfur) does not automatically guarantee compliance with regulations and reduced operating problems. With oil, there is much less slagging on furnace walls and consequently greater difficulty in maintaining design steam temperature. Another difficulty due to reduced slagging is vibration of plates and pendent elements: clean tubes apparently permit the formation of Von Karman vortices in the gas stream while slagged tubes create enough turbulence to prevent it. In some cases, stack plumes are darker than before. This is the result of the light scattering properties of the finer oil ash particles and of lowered combustion efficiency that produces more unburned carbon in the flue gas. In addition, the ash is of a sticky nature and much more difficult to collect and transport. These problems may be alleviated following complete conversion to 1% sulfur oil. Supplies of such oil are limited, however, and chemical engineers and power engineers should consider alternate solutions to the air pollution problem. First and second-generation sulfur-oxide removal processes are summarized and discussed. Also reviewed is the instrumentation available for monitoring stack emissions. Few, if any, of the instruments are suitable for long-term tests under field conditions.
APTIC-24837

ON THE ROLE OF BROWNIAN VIBRATIONS OF ULTRATHIN FIBERS IN AEROSOL FILTRATION.
J. Colloid Interface Sci., 34 (2):205-209, Oct. 1970. 7 refs.
L. V. Radushkevich.
Identifiers: *Filters, *Brownian movement, Deposition, Ussr, Aerosols, Mathematical analyses.

Ultrathin fibers in multicomponent aerosol filters can perform intensive Brownian vibrations whereby aerosol particles should be additionally captured by these fibers out of the gas flow through the filter. Theoretical calculations show that on a single fiber, 0.000005 cm in diameter and fixed at one point, the number of particles depositing at its end within one second increases 10 to 20 times in comparison with their number on the same fiber when it is motionless. This hypothesis of increased deposition from Brownian vibrations is confirmed by the higher efficiency of deposition on ultrathin fibers observed experimentally. (Author abstract)
APTIC-24840

OIL'S U. S. ANTIPOLLUTION OUTLAY SURGING.

Oil Gas J., 68 (47): 20-21, Nov. 23, 1970.
Personal Author Not Recorded.
Identifiers: *Costs, *Petroleum production, Fuel oils, Gasolines, Control equipment, Catalytic afterburners, Automotive emission control, Sulfur oxides control.

The oil industry has increased its lead over all other industries in efforts to solve problems of clean air and water. Annual spending for pollution abatement has risen from $270 million in 1966 to $559 million in 1970. Capital outlays lead all other categories as oil companies install new processing capacity for reducing sulfur, pollution control devices in plant and field, and prevention and control equipment in offshore production and transport. For the past 5 years sulfur removal has dominated the research effort with $37.3 million spent on this front alone, but combined research in reducing the four contaminants in automobile emissions has topped all other categories. Much of this effort went into the combination of catalytic converter and lead-free gasoline.
APTIC-24841

THE SOLUTION OF AIR POLLUTION CAN CAUSE WATER POLLUTION.

Water Wastes Eng., 7 (11):10-11, Nov. 1970.
Jack J. Schueneman.
Identifiers: *Solid waste disposal, *Water pollution, *Packed towers, Stack gases, Fumes, Scrubbers, By-product recovery, Design criteria.

It must be recognized that disposal of waste products from industrial operations is usually accomplished by diluting and transporting these wastes from their source into the atmosphere, watercourses, open waste lagoons, or other storage areas. Since there are no universally accepted standards for waste disposal from industrial operations, each situation requires special study of the quantity and type of waste involved, quantity and quality of water available for dilution, and any other water uses which might be adversely affected by the discharged wastes. An example of closely interrelated air and water pollution control measures at a manufacturing facility is the removal of noxious fumes generated in plating areas. The first step in disposal of nonrecoverable waste should be reduction in its volume. When salvage is feasible, it should be undertaken at as early a stage as possible. Dissolved matter from air pollution control scrubbers may set up many objectionable characteristics, such as extremes of pH, hardness, taste, odor, toxicity, froth, radioactivity, chlorine demand, and oxygen demand.
APTIC-24842

STUDIES ON THE REMOVAL OF SULFUR DIOXIDE FROM HOT FLUE GASES AS A MEASURE TO PREVENT AIR POLLUTION: IV. RECOVERY OF FLUE GAS SULFUR AS AMMONIUM PHOSPHATE.

J. Air Pollution Control Assoc., 20 (11): 762-763, Nov. 1970.
R. Kiyoura, H. Hayashi, C. Nakamoto, and M. [illegible].
Identifiers: *By-product recovery, *Ammonium compounds, *Phosphates, *Sulfates, Japan, Stack gases, Fertilizer manufacturing, So2 removal (combustion products), Temperature.

THE Kiyoura-T.I.T. process employs a completely dry method to recover flue gas sulfur as ammonium sulfate, and experimental results indicate that it is possible to change the final product from ammonium sulfate to high grade fertilizer ammonium phosphate. A fixed weight of phosphate rock, powdered to pass through a 200 mesh filter, was reacted with a fixed weight of ammonium hydrogen sulfate in the presence of water, at a fairly low temperature. The final mixture after reaction was filtered and the percentage of water soluble phosphorus pentoxide present was measured, using a colorimeter employing the molybdenum blue process. A mixture ratio of phosphate rock and ammonium hydrogen sulfate in a mol ratio of 1:1.4-1.5 was most suitable. Experiments were carried out at 30 to 250 C, and the best results were obtained when reaction was carried out for a period of 120-180 minutes.
APTIC-24844

DIESEL ENGINE EXHAUST SMOKE.

For primary bibliographic entry see Field 01.
APTIC-24845

METHOD OF ELIMINATING SULFUR DIOXIDE AND HYDROGEN SULFIDE FROM EXHAUST GAS.

(Haigasu chu no aryusan gasu musui ryusan no jokyo hoho). Text in Japanese. (Hitachi Manufacturing Co. (Japan)) Japan. Pat. Sho 45-20281. 3p., July 10, 1970. (Appl. Aug. 12, 1966, claims not given).
Saburo Tsuji, Oran Hitomi, and Zensuke Tamura.
Identifiers: *By-product recovery, *Adsorption (general), Japan, Combustion gases, Fuel oils, Adsorption, Sulfuric acid, Ammonium compounds, Vanadium compounds, Sulfates, Hydrogen sulfide, Ph.

A method is described for the adsorption of sulfur dioxide, hydrogen sulfide, and vanadium compounds from the gas generated in burning crude oil, permitting the recovery of vanadium and ammonium sulfate. In the example given, 1450-2000 ppm SO2 is passed through an adsorbing tank containing 11 tons of activated carbon, reducing the concentration to 0-150 ppm. By washing down the adsorbing tank continuously every 25 hours, 20% sulfuric acid is obtained at a rate of 134 kg/h and vanadium at 30 g/h. Ammonia is used to produce a pH of 2-3, and an extracting agent is applied to obtain vanadium acid natrium; sulfuric acid is then added in a sedimentation tank to obtain vanadium hydroxide. Ammonium sulfate from the extraction tank is evaporated and dried with heat from the boiler, and recovered at a rate of 150-170 kg/h.
APTIC-24846

THE USE OF ELECTROFILTERS IN AIR CONDITIONING.

(Der Einsatz von Elektrofiltern bei der Raumluft-Klimatisierung). Text in German. Keram. Z., 22 (9):566-569, Sept. 1970.
H. Schuetz.
Identifiers: *Air conditioning equipment, *Electrostatic precipitators, *Design criteria, Germany, Particulates, Dusts, Smokes, Spot tests, Photometric methods, Particle size, Ionization, Electrical properties, Corona, Electric charge.

Electrical precipitation of atmospheric particles is accomplished by their acquiring an electric charge through their collision with ions formed by a discharge of an ionization wire in an electric field. The positively charged dust particles are driven to a negatively charged electrode where they surrender their charge and are retained through adhesion. Normal room atmosphere contains smoke particles not exceeding 0.3 micron in size and dust particles between 1 and 10 micron in size. While the latter particles can be determined gravimetrically, the degree of pollution with smoke particles is measured by the Dill Dust Spot Discoloration Test in which polluted air is passed through a special filter paper and then the discoloration is measured photoelectrically. Different constructions of electrofilters used in connection with air conditioners are described. In these filters, dust particles adhere to water soluble oil which is sprayed on the plate condenser. While the initial cost of electrofilters is considerably higher than that of dry filters, they pay for themselves in the long run because of the accumulating replacement cost of the latter.
APTIC-24847

REBIRTH OF A BOILERHOUSE.

Preprint, American Society of Mechanical Engineers, New York, 5p., 1970. (Presented at the American Society of Mechanical Engineers Maintenance Conference, Fort Worth, Tex., 1970, Paper 70-PEM-5.)
James J. Feldkircher.
Identifiers: *Boilers, *Natural gas, *Operating variables, Costs, Coal, Industrial emission sources, Steam plants.

The factors instrumental in the decision to convert the 27-yr old coal boilerhouse of a Midwestern industrial plant to natural gas are discussed. Existing equipment, steam loads, and demands, and operational and equipment problems of the old unit are described. After analysis of 10 different systems, one was chosen in which the boilers are converted to gas, an existing gas-fired boiler is relocated, and all new feed water equipment is installed. With this system, the life of the boilers are increased to a minimum of 20 yrs, all future air pollution problems are eliminated, peak steam demands for the next five years can be met, and capital and operating costs are reduced. A brief description of the new gas burner is included.
APTIC-24854

APPLICATION OF MERCURY-INTRUSION METHOD FOR DETERMINATION OF PORE-SIZE DISTRIBUTION TO MEMBRANE FILTERS.

Science, vol. 120:805-806, Nov. 12, 1954. 16 refs.
Edith Honold, and Evald L. Skau.
Identifiers: *Porosity, *Mercury compounds, *Membrane filters, Measurement methods, Density.

Pore size distribution measurements of Millipore Filters, Type HA (hydrosol assay) were obtained with a porometer, which permitted the total void volume within the boundaries (porosity) of the samples to be calculated as well as the density of the structural material. The samples were placed in the porometer chamber, immersed in mercury, and pressure applied to cover the range from 1.32 to 1015 lb/sq in. The calculated density of the filter substance was 1.51 g/cu cm for both samples. Porosity of the original filter leaf, as estimated for bulk densities, was 79% in both cases. Although the void volumes per leaf were equal for the samples, the distribution according to pore-size radius was different due to the different cross-sectional shapes of sample channels. Because of its elliptical cross-sectional shape, one sample had a smaller effective radius and, as a result, screened out smaller particles and showed a greater resistance to flow at various pressure differentials.
APTIC-24856

THE ABSORPTION OF SULFUR DIOXIDE IN WATER.

Trans. Am. Inst. Chem. Engrs., vol. 28:162-182, 1932. 3 refs.
F. W. Adams.
Identifiers: *Water, *Packed towers, *Absorption (general), Combustion gases, Operating variables, Mathematical analyses, Flow rates, Wetting, Temperature.

The absorption of sulfur dioxide in water in a spiral-tile packed tower was studied with relation

to the effects of liquor velocity, gas velocity, and temperature on the mechanism of absorption. Data suitable for the design of absorption equipment were obtained in the practical operating range of these variables. The overall resistance to the absorption of sulfur dioxide comprises both gas and liquid film resistances, although the latter is generally of major importance. Resistance to its absorption may be reduced by increasing liquor velocity, temperature, and gas velocity; the magnitude of the effect is in the order named. Overall resistance is inversely proportional to the 0.89 power of liquor velocity. The effect of temperature on overall resistance at low gas and liquor velocities is similar to its effect in a wetted-wall tower; at higher liquor velocity, the effect is much greater. Gas velocity affects the resistance at higher liquor velocity, but is unimportant at low liquor velocity. A method is presented for calculating overall diffusional resistance. (Author summary modified)
APTIC-24868

PRACTICAL GAS TREATING. PART 4. HYDROCARBON/EG RATIO IS KEY TO SEPARATION OF EMULSION.

Oil Gas J., 66 (14):166-167, April 1, 1968. 1 ref.
Allen D. Shell.
Identifiers: *Fuel gases, *Hydrocarbons, *Drying, *Ethylene glycol (eg), Humidity, Alcohols, Emulsions.

New technology will be required for the dehydration of gas with ethylene glycol (EG), an effective and economical agent for high dew-point depression. A basic problem encountered in plants is the regeneration loss of EG where hydrocarbon emulsion is fed to the regeneration system. In the plant tests reported, the hydrocarbon/EG ratio was the true separation variable. Temperature can overcome the hydrocarbon/EG ratio when it approaches 150 F, and the separation of EG and hydrocarbons is immediate and limited only by gravity when conditions are correct. These findings led to the design of a separator system with both heat and ratio control. Ethylene glycol at 350 F barometrically heats the incoming stream according to the temperature control; this heat is not lost. A lower interface control feeds EG to the still reboiler, while an upper drawoff provides distillate to the pump suction for recycle and also hydrocarbon/EG ratio control. A third pump serves as a standby for the distillate and glycol pumps. Regeneration losses with this separator have been negligible.
APTIC-24870

LEASE-GAS SWEETENING. PART 6. HOT CARBONATE--ANOTHER POSSIBILITY.

Oil Gas J., 65 (41):167-168, 173, Oct. 9, 1967. 7 refs.
R. N. Maddox, and Michael D. Burns.
Identifiers: *Carbonates, *Potassium compounds, *Absorption, Costs, Corrosion, Natural gas, Scrubbers, Design criteria, Mercaptans, Carbon dioxide, Hydrogen sulfide, Pressure, Temperature.

Operation of the hot potassium carbonate natural gas sweetening process depends on the high partial pressure of acid gases and their reaction with a solution of the alkaline salt, K_2CO_3. The temperature of the solution is approximately 220-240 F, which permits a higher concentration of the reaction products to remain in solution. An economic comparison of both investment and operating costs shows the hot potassium carbonate process followed by an aqueous monoethanolamine process to be the best of seven different processes. This process has been successfully applied for carbon dioxide removal and for sweetening gases with both carbon dioxide and hydrogen sulfide present. Physical loss of the sweetening agent is low because of the nonvolatile nature of the carbonate solution, while for some services, as little as 20% of the steam required for an amine unit is used. The main problems to be considered in both the design and operation of a hot carbonate process are corrosion, erosion, and column instability. Mercaptans are difficult to remove, and the H_2S-to-CO_2 ratio must be very low. Most important, the process is applicable only for high-pressure gas streams. Equipment requirements and process steps are indicated.
APTIC-24871

UNDERSTANDING AIR CLEANER RATING METHODS AIDS ACCURATE SELECTION AND APPLICATION.

Air Cond., Heat., Ventil., 61 (6):59-61, June 1964. 11 refs.
Gary N. Deming.
Identifiers: *Dusts, *Filters, *Efficiency, Carbon black, Particle counters, Photometric methods.

Methods and tests for rating air cleaners are discussed. Although gravimetric analyses are accurate, the results are not indicative of the effectiveness of a given air filter or cleaner on atmospheric dust. The fault of this test is the use of an artificial dust which does not approximate atmospheric dust; it reflects only a percentile value in terms of the weight of the substance collected rather than the number of particles that comprise the mixture. However, the efficiency of any material on any size of atmospheric particulate may be determined by a combination of the particle counting and discoloration tests. In discoloration tests, the light transmission of a white laboratory paper is measured before and after exposure to filtered air. Since the activated carbon is doing all the work in vapor air cleaners, methods of rating activated carbon must also be considered. Activity may be indicated by per cent by weight of carbon tetrachloride that it will adsorb, minutes of chloropicrin, or benzene adsorption. The operating effectiveness of the partial detention type unit is approximately 20%, which means that there are air spaces between the carbon cells; operating effectiveness of the total detention type is between 85-95%.
APTIC-24872

THERMOCHEMICAL STRENGTH OF GLASS FIBER USED IN BAG FILTERS.

Tsvetn. Metal., 9 (6):97-100, June 1968. 4 refs.
L. N. Bykhover, and I. L. Peisakhov.
Identifiers: *Thermochemical strength glass fabrics, Materials deterioration, Ussr, Dusts, Bag filters, Glass fabrics, Treated fabrics, Chlorine compounds, Temperature.

The use of glass-fiber fabrics in bag filters is particularly promising because of the high thermochemical strength of these fibers. The results of tests designed to determine the possible range of applications of glass-fiber are presented. The tests determined the effect of temperature, chlorine, water vapor, titanium tetrachloride, and dust on the strength of the fiber. Determinations were made of the wear-strength (the basic factor governing the service life of such fabrics) using the MIT device in cycles of double bend to failure. In industrial filters, an increase in temperature leads to a failure of the oil or dressing film on the fabric and reduces the wear resistance of the filtering cloth. In selecting a particular type of cloth it is necessary to take into account the type of dust acting on the fabric. A dust layer settling on cloth during filtration will change the wear conditions during bending. The effects of different coatings on the fabrics are determined. The results of the various tests are tabulated for easy reference.
APTIC-24878

INDUSTRIAL AIR POLLUTION--ITS CONTROL AND COST.

Design News, 23 (14):18-24, July 5, 1968.
Andrew Kazarinoff.
Identifiers: *Industrial emission sources, *Control equipment, Costs, Cements, Steel, Particultates, Electric power production, Kilns, Primary metallurgical processing, Centrifugal separators, Electrostatic precipitators, Bag filters, Scrubbers.

Power generating plants, steel mills, and cement kilns are included in the groups that will be forced by government restrictions to control pollutants. The industrial air pollution control equipment available now, the cost of pollution control to industry, and some air pollution problems for which there are yet no practical solutions are discussed. No real innovations have been made in control equipment for a long time; the major devices are still electrostatic precipitators, bag filters, cyclones, and scrubbers. Research and development is needed on equipment that can control both particulate and gaseous pollutants; equipment that can perform at higher efficiencies without size and cost penalties; equipment whose efficiency curve is relatively flat over broader ranges of particle size; and lower-cost equipment.
APTIC-24881

INVESTIGATION OF MASS TRANSFER IN A SCRUBBER WITH TAPERED-SLOT TRAYS.

(Issledovaniye protsessa massoobmena v skrubbere s konusno-shchelevymi tarelkami). Text in Russian. Khim. i Neft. Mashinostr., no. 9:25-26, 1965. 2 refs.
S. F. Khokhlov, V. A. Annenkov, and G. A. Shutkin.
Identifiers: *Scrubbers, *Absorption (general), Ussr, Sulfur dioxide, Fluid flow, Flow rates.

Mass transfer in a scrubber with tapered-slot trays was studied on a large test installation using an SO_2--water mixture at water flow rates of 500 to 2000 kg/sq m-h, and gas flow rates of 300 to 1300 kg/sq m-h. A maximum partial coefficient of mass transfer (K) occurred at an optimum water flow rate of 1750 kg/sq m-h. A value for K of 15,450 kg/cu m-h-atm was obtained for optimum water flow rate and a gas flow rate of 1200 kg/sq m-h.
APTIC-24885

TRIBUTARY VENTILATION WITH A FOAM FILTER.

(Pritochnaya ventilyatsiya s penofil'trom). Text in Russian. Ogneupory (USSR), 34 (8):60-62, Aug. 1969.
A. Kh. Mateosov.
Identifiers: *Air conditioning equipment, *Filters, *Ventilation, Ussr, Dusts, Humidity, Carbon dioxide, Sulfur dioxide, Flow rates, Cooling, Temperature.

An 8000 cu m/hr-capacity ventilator arrangement, utilizing a foam filter, and providing at least 98% dust removal together with total gas (CO_2, SO_2, etc.) release and 22-32 degree C cooling (to 16-20 C), is described. The temperature-humidity curve, used to determine maximum possible cooling with this ventilator, is presented. Initial air at 28 C and 40% relative humidity can be cooled to 18.5 C with a moisture content of 13.5 g/kg; initial air at 22 C and 43% relative humidity--to 14.3 C and 10.1 g/kg.
APTIC-24887

ENGINEERING OUTLINE 94: DUST COLLECTION.

Engineering (London), 204 (5295):605-608, Oct. 13, 1967.
Personal Author Not Recorded.
Identifiers: *Dusts, *Control equipment, Great britain, Smokes, Particle size, Air conditioning equipment, Collectors, Centrifugal separators, Filters, Bag filters, Filter fabrics, Scrubbers, Spray towers, Venturi scrubbers, Gravity settling, Inertial separation.

Dust collection is defined as the removal of solid particles from the gas in which they are suspended. Particles are usually classified as dust or grit when they are below 80 micron in size; those less than 0.3 micron are known as smoke. The term dust collector is generally used for equipment dealing with heavily laden gas; the term air cleaner is normally reserved for apparatus handling large quantities of air containing only a little dust, such as air conditioning equipment. The efficiencies of various collectors are compared as are

those of various air cleaners. The particle collection devices considered are categorized as depending on gravitational, inertial, physical, electrostatic, diffusional, or thermal force. It is noted that the same general methods of cleaning are used in air cleaners but that bag or cloth filters make up the greatest number of cleaners. The efficiencies of fabric filters at five micron approaches 100%, as do the efficiencies of venturi scrubbers and wet electrostatic precipitators.
APTIC-24891

PH VALUE OF AMMONIUM SULFITE-BISULFITE SOLUTIONS.

(O znacheniyakh pH rastvorov sul'fit-bisul'fita ammoniya). Text in Russian. Zh. Prikl. Khim., no. 32:1385-1388, 1959. 3 refs.
B. A. Chertkov, D. L. Puklina, and T. I. Pakareva.
Identifiers: *Ammonium compounds, *Sulfites, *Ph, *Absorption (general), Ussr.

Experimental plots for pH as a function of S/C (bisulfite-to-sulfite) ratio of ammonium sulfite-bisulfite solution are given both for prepared solutions and solutions obtained from industrial operations. Close similarity of the two curves indicates that the presence of ammonium sulfate and thiosulfate, trace amounts of inhibitor additives, and fly ash in the industrial solutions have practically no effect on the pH. Total concentration of ammonium sulfite-bisulfite in the solution also had little effect on the measured pH. A sharp drop in pH from about 5 to about 3 for S/C ratios near 9.5-1.0 requires very careful determination of the solution composition when making conversions from S/C to pH values in this range.
APTIC-24895

IS IT POSSIBLE TO BUILD AND OPERATE A COMPLETELY ODORLESS KRAFT MILL?

Can. Pulp Paper Ind. (Vancouver), 10 (9):21-22, 24, 26, 28, 30, 32, 34, Sept. 1957.
R. H. Wright.
Identifiers: *Odors, *Paper manufacturing, *Odor counteraction, Costs, Canada, Dusts, Kraft pulping, Electrostatic precipitators, Bag filters, Scrubbers, Black liquor oxidation, Sodium compounds, Mercaptans.

It is possbile to build a completely odorless kraft mill if management is willing to pay the price. The initial down payment would pay for odor control equipment; the direct installment payments are the costs of maintaining all the odor control equipment at top efficiency; indirect installment charges occur whenever it is necessary to limit production to prevent odor emission. Most kraft odors are due to organic sulfur compounds such as methyl mercaptan and its oxidation products. The kraft operation also emits particulate matter, mostly compounds of sodium. The sources of emissions are discussed, and control measures are described. Dusts are usually removed by a combination of scrubbers, bag filters, or electrostatic precipitators. The process of black liquor oxidation is discussed. When it is properly oxidized, the release of odors from black liquor is greatly curtailed. Research in the areas of contaminant identification and quantification is necessary in order to get a better understanding of effective design characteristics.
APTIC-24903

METHOD FOR CONVERTING HYDROGEN SULFIDE TO OBTAIN SULFUR.

(Werkwijze voor het omzetten van zwavelwaterstof onder winning van zwavel). Text in Dutch. (Bataafsche Petroleum Maatschappij N. V. (Netherlands)) Netherlands Pat. 72,580. 3p., July 15, 1953. (Appl. July 6, 1950, 5 claims).
Personal Author Not Recorded.
Identifiers: *Hydrogen sulfide, *Catalysts, *Reduction, *So2 removal (combustion products), Europe, Combustion gases, By-product recovery, Aluminum compounds, Aluminum oxides, Sulfates, Temperature.

Hydrogen sulfide is partially oxidized to sulfur dioxide and the remainder of the H2S is converted by means of the SO2. This latter process is carried out in the presence of molded pieces of aluminum oxide containing water of hydration. By preference these are prepared at a temperature in the range of 400-800 C. The powdered aluminum oxide used to prepare the catalyst should have a grain-size below 0.5 mm, 5 wt % of which should have a particle size greater than 210 micron and 30-60 wt % a grain size smaller than 74 micron. The paste from which the molded objects are made should contain 12-20 wt % water, including the water of hydration. A recommended possibility is the use of an aluminum sulfate solution in the preparation of this paste.
APTIC-24908

AIR POLLUTION IN HOLLAND.

In: Problems and Control of Air Pollution. F. S. Mallette (ed.), New York, Reinhold, 1955, Chapt. 22, p. 236-244.
Linden Ter.
Identifiers: *Dusts, *Steam plants, *Particle size, *Collectors, Proposals, Europe, Mathematical analyses.

Recent investigations made near a large power station in Holland, where people were complaining bitterly about desposited dust, showed that 75-80% of the dust collected in the exposed region consisted of particles larger than 50 microns, although the dust leaving the stacks contained only 10-15% particles with diameters greater than 50 microns. Thus the weight of the deposited matter in grains per sq ft per day, not the dust content of the gases inside the stack, is the measure of the nuisance in the exposed area. The solution of the dust problem in the case of coarse particles is to be found in the installation of selective dust separators with a collection efficiency of about 100% for particles larger than 40 microns.
APTIC-24915

REMOVAL OF SULFUR DIOXIDE FROM POWER-PLANT STACK GASES.

In: Problems and Control of Air Pollution. F. S. Mallette (ed.), New York, Reinhold, 1955, Chapt. 14, p. 143-154. 16 refs.
R. L. Rees.
Identifiers: *Water, *Steam plants, *Scrubbers, *So2 removal (combustion products), Great britain, Stack gases.

At a London power station, more than 95% of the sulfur dioxide is removed from flue gases derived from 3.8% sulfur oil by washing the gases with water supplied by the river Thames. The gas is washed on grid scrubbers, with a small amount of chalk added to the water to maintain its alkalinity. Crude manganese sulfate is added to the effluent to activate the oxidation of sulfite in the aeration tank. The effluent also passes through a settler to remove excess solids before being mixed with 12 times its bulk of water. The product of the treatment, calcium sulfate, is returned to the river in solution. The defects of the process are the high cost of maintenance, the extent to which it cools the gas, and the severe limitations on the sites at which it can be used. Alternative processes are the costly cyclic lime process and the ammonia liquor process, which is restricted in its application by the supply of ammonia liquor.
APTIC-24916

THE REVAPORIZATION OF LIQUEFIED NATURAL GAS.

Eur. Oil, 5 (1):46-48, Jan. 1966.
V. H. Abadie.
Identifiers: *Compressed gases, *Natural gas, *Vaporization, Heat transfer.

The vaporization facilities at a liquefied natural gas plant perform the important job of converting the LNG back to a usable gaseous state. A vaporization plant consists essentially of 1) the LNG pumps for satisfying pressure and flow requirements, 2) the vaporizers for supplying heat to the LNG, and 3) the control system for regulating flow, pressure, and temperature of the revaporized LNG. Two types of gas-fired vaporizers are used at peak shaving plants in the United States, one utilizing an all-convection surface, fired heater to heat an intermediate fluid which flows in a closed circuit to an LNG exchanger the other submerged combustion burners to produce a hot water bath by direct contact with the combustion gases. At a base-load plant, LNG can be safely vaporized in atmospheric exchangers with ambient temperature water as the heat source. Future developments may make possible the recovery of the low-temperature energy wasted during vaporization. This loss represents all the energy expended on the gas during liquefaction and is a sizeable quantity having significant economic potential.
APTIC-24919

ENEMIES IN THE AIR.

Graphic Arts Monthly, 41 (7):52-56, July 1969. 4 refs.
John M. Kearney, and Richard R. Meyer.
Identifiers: *Electric charge, *Electrodes, *Particulates, Printing, Bag filters.

Many machines and processes in the graphic arts industry produce very strong electrostatic fields that cause airborne contaminant deposition. One method of eliminating this problem is to place a unit containing electrodes near the primary air control medium. When secondary air (ninetenths of the total air) passes through the unit, the electrical charges on the airborne particles are effectively neutralized by an electric field. The result is that the working space is controlled at a near neutral space condition. Because the particles remain suspended, they eventually return to the unit where they are collected in bag filters.
APTIC-24920

TACKLING THE PROBLEM OF NITROGEN OXIDES.

Power, 113 (4):63-66, April 1969. 9 refs.
Charles R. LaMantia, and Edwin L. Field.
Identifiers: *Nitrogen oxides, *Decomposition, *Combustion, *Process modification, Steam plants, Catalytic oxidation, Catalytic activity.

The problem of atmospheric nitrogen oxides is analogous to that of sulfur dioxide in that fossil fuel-burning power plants are the main emission sources. However, the amount of SO2 generated per ton of fuel consumed is precisely fixed by the sulfur content of the fuel. The concentration of nitrogen oxides in stack gases depends primarily on temperature profile, gas residence time, and oxygen and nitrogen concentrations profiles in the furnace. All these factors are functions of furnace design and burner design and operation. The chemistry of nitrogen oxides affords the possibility of limiting their formation by modifying the combustion process or destroying them by catalytic decomposition. At stack-gas temperatures and nitrogen oxide concentrations, spontaneous decomposition should occur with the proper catalyst. These two approaches would solve the nitrogen oxides problem without significant complications, e.g., the need to build a nitric-acid plant. A further approach, potentially attractive to operators who require SO2 control, is a single process effective for both SO2 and nitrogen oxides control. The least desirable solution would be a separate process for removal of nitrogen oxides from stack gases.
APTIC-24922

NEW POTENTIAL ABSORBENTS FOR SULFUR OXIDES REMOVAL FROM FLUE GAS.

American Chemical Society, Washington, D. C., Div. of Water, Air, and Waste Chemistry and American Chemical Society, Washington, D. C. Div. of Petroleum Chemistry, Inc., Joint Symposium on Experience with Pollution Control

Equipment, Chicago, Ill., 1967, p. A9-A15. 14 refs. (Sept. 11-15.)
J. H. Field, J. G. Myers, J. W. Mulvihill, and H. W. Wainwright.
Identifiers: *Stack gases, *Absorption (general), By-product recovery, Catalytic oxidation, Sulfur trioxide, Temperature.

An investigation of potential new absorbents for sulfur oxides removal from flue gas at elevated temperatures is described. Bench-scale tests show that some relatively inexpensive minerals, such as oil shale, red mud, phosphate rock, and zinc oxide, react with sulfur dioxide or sulfur trioxide at elevated temperature levels available in a power plant. While bench-scale tests with simulated flue gas can only be considered preliminary, some of the tested materials may have potential for sulfur oxides removal from flue gas in a once-through operation to require minimum space and capital investment, as absorbents in a cyclic regenerable process, or following catalytic oxidation to remove SO3 and then either be disposed of or processed to recover useable products. Red mud waste from bauxite processing appears to be the most versatile material of those tested to date in that it applies to all three categories. Moreover, it has been tested briefly with flue gas from coal combustion. In a once-through system it could have an advantage over injection of dolomite in that red mud absorbs SO2 at a much lower temperature of about 300 C, it would not have to be injected into the high temperature zone of the furnace as is the case with dolomite. Also, it removes SO3 very readily and with high capacity, and might be used following catalytic oxidation similarly to the Kiyoura process. Some of the adsorbents tested are limited in availability or are tied to a specific product. The oil shale may be of interest as an absorbent when a shale oil industry is established, because large quantities of spent shale will then be available. (Author abstract modified)
APTIC-24932

METHOD FOR THE PREPARATION OF A CATALYST FOR THE CONVERSION OF H2S AND/OR SO2 TO ELEMENTARY SULFUR.

(Verfahren zur Herstellung eines Katalysators fuer die Gewinnung von Elementarschwefel aus H2S und/oder SO2). Text in German.
(Metallgesellschaft A. G., Frankfurt (W. Germany) and Deutsche Gold- und Silber Scheideanstalt vormals Roessler (West Germany))
West Ger. Pat. 1,064,925. 5p., Sept. 10, 1959. (Appl. July 5, 1956, 3 claims).
Wilhelm Thuman, Gerd Roderburg, and Gerhard Steenken.
Identifiers: *Aluminum oxides, *Catalysts, Germany, So2 removal (combustion products), Hydrogen sulfide, Reduction, Surface properties, Temperature.

A catalyst for converting hydrogen sulfide and/or sulfur dioxide to elementary sulfur essentially aluminum trioxide, is prepared from aluminate mother lye by stirring without the addition of an acid at 80 C in a way which causes 'hydrargillit' to precipitate from the liquor with a linear growth velocity of from 10 to 40 and 100 to 400 microns/hour. The process is periodically interrupted in order to create a stratified structure of the aluminum hydrate precipitate. The 'hydrargillit' precipitate is then hardened by drying and subsequently activated at temperatures ranging from 350 to 550 C in order to achieve at least a partial conversion of the 'hydrargillit' to boehmit or possibly to gamma Al2O3. The resulting catalyst has a textured lumpy consistency characterized by very fine pores with an inner surface of 100-300 sq m/g, which is ideally suited for the catalytic conversion of H2S and/or SO2 to sulfur.
APTIC-24936

SEPARATION OF PLASTICIZER MISTS IN THE PROCESSING OF PVC MIXTURES.

(Das Abscheiden von Weichmacher-Nebeln beim Verarbeiten von PVC-Weichmischungen). Text in German. Kunststoffe, 59 (7):416-418, 1969.
Guenter Staechlk.
Identifiers: *Chemical processing, *Electrostatic precipitators, *Chlorinated hydrocarbons, Plastics, Germany, Mists, Flow rates, Ionization, Temperature.

The electrostatic filter is described for separation of mist forming pollutants from the exhaust gas in processing of plasticized polyvinylchloride (PVC). The particles dispersed in the form of mist in cooled exhaust gas are charged by the collisions with ionized air molecules. Their discharging takes place in a collector of the filter, consisting of a set of plates of alternating positive and negative charge along the air stream. The optimum temperature for separation of pollutant particles is 30 C (but not more than 50 C). The device for cooling down the stream of purified gas before it enters the filter is described. The linear velocity of the air stream across the filter surface has to be kept constant for optimum particle charging and optimum degree of separation to take place. A practical example is given in which the degree of separation achieved was 99%. The final concentration of mist-forming substances blown into the air was 5 mg/cubic meter.
APTIC-24937

COMBUSTION POWER UNIT – 400: CPU-400.

Bureau of Solid Waste Management Contract Ph 86-67-259, 15p., 1969. NTIS: PB 187299
Personal Author Not Recorded.
Identifiers: *Electric power production, *Solid waste disposal, *Gas turbines, Costs, Particulates, Incineration, Collectors, Design criteria, Combustion.

Development has begun on a turbogenerator electric plant that will utilize 400 tons of municipal solid waste per day to produce up to 15,000 kw of electric power. The baseline configuration is a modular unit that is expected to be clean, compact, and quiet. Such units could be conveniently dispersed throughout a city to supplement power supplied by local utilities. The major components of the system are a refuse carousel, a mechanical shredder, a refuse combustor using a fluidized bed reactor, a two-stage particle collector packed with the fluid bed reactor, a 15 megawatt gas turbine, and a 3600 rpm generator. Using either available energy or by-products from the combustion steam, add-on systems to the basic unit provide (1) automated vacuum collection of refuse, (2) fresh water produced from saline or brackish water, (3) centralized steam for commercial heating and air conditioning, and (4) incineration of sewage sludge. Estimated capital and operating costs of the plant are summarized, as is the expected income from electric power, steam, and by products. Costs for refuse disposal may be as little as 95 cents per ton.
APTIC-24954

A METHOD FOR TESTING HIGH EFFICIENCY MECHANICAL FILTERS FOR THE SEPARATION OF RADIOACTIVE AEROSOLS AND FOR PERSONAL PROTECTION.

(Ueber Methoden zur Pruefung hochwertiger Schwebstoffilter zur Abscheidung radioaktiver Aerosole und fuer den persoenlichen Schutz). Text in German. Staub (Duesseldorf), 21 (7):281-285, July 1, 1961. 3 refs.
Dieter Hasenclever.
Identifiers: *Measurement methods, *Membrane filters, *Protective masks, Germany, Aerosols, Particle size, Treated fabrics, Radioactive radiation.

Three devices for testing aerosol filters for collection of radioactive aerosols (quartz dust apparatus, oil-mist apparatus, test apparatus using radioactively labelled aerosols) are described. The requirements for a dust mask for protection against radioactive dusts are discussed with respect to filter efficiency and test results on reactor filter materials. Testing with aerosols of only one size or of only a narrow size range is inadequate for the positive assessment of a filter material. A fourth apparatus now under construction, for testing high efficiency filter cells by means of oil mist up to a loading of 3000 cu m/hr, is mentioned. (Author abstract modified)
APTIC-24967

ANOTHER NEW ENGINE NUDGES DETROIT.

Business Week, no. 2147:86-87, Oct. 24, 1970.
Personal Author Not Recorded.
Identifiers: *Warren engine, *Engine design modification, Power sources, Gas turbines, Automobiles, Design criteria.

A new, low pollution engine, the Warren Engine, is described. In scientific principle, the Warren engine is similar to a gas turbine, but the compression is done by a bank of pistons. The hot air and fuel are combined in a separate combustion chamber, and the combustion gases then expand into a second bank of pistons; these turn the driveshaft. If Detroit were to adopt Warren's reciprocating engine, it is believed that auto companies would need to do only a fifth of the retooling needed to produce, say, an automotive steam engine. The new engine probably would cost only $50 to $100 more to make than the present internal combustion engine, not counting the investment. In Warren's engine, fuel is sprayed into the center of the combustion chamber, away from cool walls, and excess air is added past the ignition area. Nearly complete fuel combustion is the key to the low-pollution potential of his engine, and he figures that at high speeds his engine would use 15% to 25% less fuel than current engines. At low speeds the savings would be up to 50%. In addition, the engine could operate on any available fuel, including low octane, leaded or unleaded, or diesel.
APTIC-24968

A PROCESS FOR THE NEUTRALIZATION OF TOXIC VAPOURS AND WASTE GASES.

(Verfahren und Anlagen zur Unschaedlichmachung giftiger Daempfe und Abgase). Text in German. Wasser Luft Betrieb, 11 (2):65-70, 1967.
Friedmund Rueb.
Identifiers: *Odors, *Fumes, *Control methods, Carbon black, Germany, Combustion products, Aerosols, Electrostatic precipitators, Spray towers, Absorption, Adsorption, By-product recovery, Catalytic oxidation, Odor counteraction, So2 removal (combustion products), Organic acids, Acetic acid, Benzoic acid, Phthalic acid, Sulfonic acid, Ammonia, Naphthalenes, Quinones, Carbon monoxide, Temperature.

Offensive, toxic, or noxious waste gases emanating from various industrial processes are neutralized by absorption, by adsorption on activated carbon or by catalytic combustion. Processes include the old method of washing acid waste gases in adsorption towers with chemically resistant polyvinylchloride or polyethylene lining by means of water or of alkaline washing liquids and the new method of wet pressure change separation which divides the stream of gas into thin layers by numerous ducts which system is suited for the separation of aerosols and for gas purification by absorption. Adsorption on activated carbon permits the recovery of valuable solvents which is accomplished by various methods depending on the degree of water solubility of the substance to be recovered. Catalytic combustion operates with temperatures between 150 and 400 C and is often employed where offending odors must be controlled like in the production of phthalic and maleic acids where naphthoquinone, benzoic acid and carbon monoxide must be destroyed because they are toxic and corrosive. Currently widely used is a modern arrangement consisting of two steel towers where SO2 containing gases are washed

with diluted ammonia. Other methods separate aerosol fogs by means of electrofilters with simultaneous recovery of the pollutant and control of objectionable odors emanating from biological processes by biofilters in which certain bacterial strains deodorize the air by consuming the offending substances as food.
APTIC-24969

MICROBIAL REMOVAL OF SULFIDE CONTAINED IN PETROLEUM.

(Biseibutsu ni yoru sekiyuchu no iwokagobutsu no jokyoho). Text in Japanese. (Assignee not given.) Japan. Pat. Sho 45-23831. 4p., Aug. 10, 1970. (Appl. Aug. 3, 1967, claims not given).
K. Yamada, Y. Minoda, S. Nakaya, K. Kodama, and T. Akazaki.
Identifiers: *Bacteria, *Fuel oil preparation, Japan, Fuel oils, Sulfides.

A method is described for reducing the sulfide contained in petroleum to water soluble sulfide by utilizing the recently discovered bacillus, Pseudomonas abikonensis. Combined with Pseudomonas jianii, a bacillus also separated from the soil, effective desulfurization is accomplished. In an experimental case, a dibenzothiophene light oil was desulfurized up to 10% and a crude oil up to 3% by the Pseudomonas abikonensis alone, while the effect was increased to 25% for the light oil and to 7% for the crude oil when the Pseudomonas abikonensis was combined with the Pseudomonas jianii.
APTIC-25101

DUST COLLECTION IN INDUSTRY.

Filtration Separation (Purley), 7 (6):695-699, Nov.-Dec. 1970. 11 refs. (Presented at the Institution of Chemical Engineers and the Filtration Society Filtration Symposium, London, England, March 18, 1970.)
W. B. Lawrie.
Identifiers: *Dusts, *Exhaust systems, Great britain, Aerosols, Particle size, Ventilation, Design criteria.

Many industrial processes and machines are sources of coarse dusts or aerosols. These sources can be effectively and efficiently controlled by means of properly designed exhaust hoods and exhaust ventilating systems. Dusts can be divided into the two broad categories of grit (over 100 micron) and aerosols (below 20 micron). This distinction is necessary because the two size ranges behave differently and often leave their source along different paths. Design criteria for successful exhaust hoods are considered. The dust lamp is an important tool for exploring the movement of dust from its source and for examining the performance of existing control equipment. When the path of dust movement is established, the type of hood which will be most effective can be determined. The many shapes and sizes of hoods can be classified as total enclosures; booths; captor hoods; or receptor hoods. Some recent control methods developed for modern industrial equipment with the help of the dust lamp are described.
APTIC-25538

PROBLEMS IN AEROSOL FILTRATION.

Filtration Separation (Purley), 7 (6):692-694, Nov.-Dec. 1970. 22 refs. (Presented at the Institution of Chemical Engineers and the Filtration Society Filtration Symposium, London, England, March 18, 1970.)
C. N. Davies.
Identifiers: *Aerosols, *Filters, *Electric charge, Deposition, Great britain, Operating variables, Filter fabrics.

A discussion of electrical forces in filtration and the clogging of fibrous filters is presented. There are two ways of exploiting electrical forces for filtering air: to charge the particles and move them to collecting surfaces by the Coulomb force; and to induce a dipole charge on a particle with zero net charge by passing it through an electrical field. The charge on particles of aerosol can arise at the moment of generation or it can be acquired later by the collection of gas ions. The effect of particle charges on filtration efficiency in uncharged filters is discussed. If an electric field is applied across a fibrous filter, the fibers become polarized. The particles, as they pass through, will also be polarized; the resulting effect on filtration depends on whether, in addition to the polar displacement of charge in each particle, there is or is not an additional net charge on the particle. As a deposit builds up inside a filter during use, the penetration of particles through the filter decreases and the resistance rises. Different types of filtering material have differing rates of increase in resistance.
APTIC-25539

APPARATUS FOR REDUCING HYDROCARBON CONTENT OF ENGINE EXHAUST GASES DURING DECELERATION OF AUTOMOBILE.

(Assignee not given.) U. S. Pat. 3,533,386. 7p., Oct. 20, 1970. (Appl. date not given, 3 claims).
Personal Author Not Recorded.
Identifiers: *Engine operating cycles, *Air-fuel ratio, *Hydrocarbons, Engine exhausts, Automobiles, Carburetion.

An apparatus for reducing the hydrocarbon content of engine exhaust gases during deceleration of the automobile is described. The system operates by controlling both the air-fuel ratio of the air-fuel mixture to be drawn into the engine by way of the slow running mixture supply flow path of the carburetor, and the level of intake manifold vacuum while in the deceleration phase of operation. This method exhibits advantages over prior methods in that the prior methods encounter difficulties in maintaining the air-fuel ratio of the engine fuel at a proper level invariably under the widely varying driving conditions and without impairing the driveability of the automobile.
APTIC-25540

DISTRIBUTION OF CARBON DIOXIDE AND SULFUR CONTAINING IMPURITIES IN THE GAS DISTRIBUTION STREAM.

(Raspredeleniye primesey dvuokisi ugleroda i sernistykh soyedineniy po potokam gazorazdelitel'noy ustanovki). Text in Russian. Khim. Prom. (Moscow), no. 5:390, 1970.
Z. D. Guseinova, Yu. V. Savelev, V. V. Kostin, and Ya. R. Veliev.
Identifiers: *Fuel gases, *Desulfurization of fuels, *Alkaline additives, Ussr, Scrubbers, Organic sulfur compounds, Carbon dioxide, Hydrogen sulfide, Temperature.

Pyrogas (10.0% H2, 25.2% CH4, plus higher hydrocarbons) was studied to determine the effectiveness of alkali purification in removing carbon dioxide (200-300 ppm), hydrogen sulfide (1000-1500 mg/cu m), and organosulfur compounds (10-20 mg/cu m). Purification was carried out under the following conditions: Column 1, 40 C, 3% alkali; and Column 2, 55-60 C, 6% alkali. Carbon dioxide was concentrated in the ethane-ethylene and ethylene fractions, and sulfur compounds in the propane-propylene and ethane fractions. Concentrations following treatment were: CO2, 6 ppm; organosulfur compounds, 1.5 ppm; H2S, 0.05 mg/cu m, all well below allowed limits.
APTIC-25547

CUPOLA DUST REMOVAL WITH REGARD TO THE PROJECTED STANDARD VDI 2288 ON 'LIMITATION OF DUST EMISSION FROM CUPOLAS'.

(Kupolofen-Entstaubung unter Beruecksichtigung des Richtlinien-Entwurfs VDI 2288, Blatt 1 'Auswurfbegrenzung Kupoloefen'). Text in German. Giesserei praxis, no. 21:342-345, Nov. 10, 1970. 1 ref.
H. Beck.
Identifiers: *Emission standards, *Dusts, *Cupolas, Iron, Germany, Combustion gases, Centrifugal separators, Electrostatic precipitators, Filters, Scrubbers, Ventilation, Sulfur dioxide, Cooling, Ph.

The most important difference between the proposed VDI guideline and the previous legal standard is that dust emission must not exceed 1.5 kg per ton of iron. It also recognizes that hot blast cupola furnaces emit a greater share of fine dust. Dust arrester calculations should be based on the assumption that raw gas contains 8 kg dust per ton iron, and that a ton of iron generates 2400 N cu m waste gas. These data are valid only for cold blast cupolas. Most small enterprises and enterprises working only for short periods per year use cyclone for dust removal; but their dust removal efficiency only just about meets the newly proposed standard. To improve performance, gases entering cyclones should be thoroughly cooled. Medium pressure wet washers usually work with a residual efficiency of 200 to 300 mg/ N cu m, they require an operator and alkalization of the washing liquid because damage from corrosion can be prevented only above pH 9. The drawback of wet washers is that even small sulfur dioxide residues in the purified water-saturated waste gas tend to sink fast to the ground and pollute the air. Filter dust arresters are the most efficient of all; they do not require a stack and are space saving. They work with an efficiency of 0.3 kg/ton iron for both cold and hot blast cupolas. Important in all systems is the cooling of hot gases which can best be achieved by pipe assembly heat exchangers equipped with automatically regulated axial ventilators.
APTIC-25548

DE-DUSTING DEVICE FOR SMOKE AND OTHER GASEOUS FLUIDS.

(Mediterranea Compagnia Industriale Commissionaria e Commerciale S.p.A., Milan (Italy)) U. S. Pat. 3,533,222. 8p., Oct. 13, 1970. 28 refs. (Appl. Aug. 31, 1966, 3 claims).
Enrico Gasperini.
Identifiers: *Dusts, *Smokes, *Centrifugal separators, *Electrostatic precipitators, Italy, Particle size, Design criteria.

A de-dusting device is described that effectively separates particles suspended in smoke and collects them according to size and density. The device includes a cylindrical casing provided with an inlet pipe for the smoke, an exhaust pipe for the de-dusted smoke, and a rotatable shaft located lengthwise within the casing and provided with discs located near annular deflectors defining a sequence of cylindrical chambers communicating with each other. The casing is provided with a suction fan for delivering the smoke to the exhaust pipe. An electrostatic precipitator-discharge unit is mounted in the inlet pipe of the casing: it consists of grids and is used for discharging the electrostatic charges present on the particles carried by the smoke. After passing through the electrostatic precipitator unit, the smoke is sucked toward the space between discs and deflectors and is here submitted to the centrifuging action by the high-speed rotating discs and to a mechanical action generated by holes in the discs. Because of the centrifugal force, the gas is thrown towards the periphery of the discs and moves along the deflectors. Particles in the gas are thrown against the wall of the cylinder and drop into collectors. The number of rotating discs, and their speed of rotation, are selected so as to obtain in the treated gaseous mass the generation of high frequency sound waves.
APTIC-25550

SULFUR EXTRACTION USING TRICHLOROETHYLENE IN PRESENCE OF LIMESTONE, TRONA, AND SODA ASH.

(Chapman, Wood and Griswold, Ltd., North Vancouver (British Columbia)) U. S. Pat. 3,535,089. 5p., Oct. 20, 1970. 11 refs. (Appl. Sept. 12, 1968, 7 claims).
Clifford J. Lewis, Jean P. Champagne, Jean McPherson, and June Paramore.

Identifiers: *By-product recovery, *Solvent refining (low ash), *Alkaline additives, Limestone, Canada, Solvents, Mining, By-product recovery, Chlorinated hydrocarbons, Hydrocarbons, Ethylene, Calcium compounds, Ph.

An economical, technically feasible process and apparatus are described for the prevention of solvent loss in the extraction of high grade sulfur from elemental sulfur bearing material. This has been accomplished using a hydrocarbon solvent in conjunction with a substance which maintains the pH of the ore and the sulfur saturated solvent in the range of from about 3 to 8 during the solvent extraction operation. The hydrocarbon solvent may be trichloroethylene, although other chlorinated hydrocarbons and other solvents such as aromatic hydrocarbons and aliphatic hydrocarbons may be utilized. Such materials as limestone and trona reduced to a suitable fineness may be used to accomplish the desired pH. In addition, soda ash may be employed. The sulfur saturated solvent containing dissolved sulfur is separated from the residual feed and cooled to crystallize elemental sulfur. The crystallized sulfur is separated from the solvent, the residual solvent from the crystallized sulfur and from the gangue recycled; the cooled solvent which contains some crystallized sulfur is recycled to the contacting stage.
APTIC-25552

CATALYST FOR ENGINE EXHAUST-GAS REFORMATION.
(Assignee not given.) U. S. Pat. 3,533,753. 10p., Oct. 13, 1970. 5 refs. (Appl. Oct. 31, 1966, 16 claims).
Heinz Berger.
Identifiers: *Catalytic afterburners, *Automotive emission control, *Catalysts, Construction materials, Platinum, Refractories, Germany, Engine exhausts, Internal combustion engines, Catalytic oxidation, Design criteria, Aluminum compounds, Cobalt compounds, Copper compounds, Magnesium compounds, Silicates, Heat transfer, Permeability.

A method of making a catalyst body for the reformation (such as oxidation) of the exhaust gases from internal combustion engines is described, whereby the costs of the body can be reduced and an effective throughput obtained with a minimum of cavitation and catalyst migration. The method comprises the steps of forming a paste with a catalyst substance and a refractory catalyst support, applying the paste to the interstices of a thermally destructible support, shaping the body consisting of this support and the paste therein, and thereafter thermally removing the fabric support to form a porous mass. The resulting catalyst body then consists of a mass of refractory material homogeneously intercollated with the catalyst material and penetrated by uniform and mutually interfacing capillaries in the places formerly occupied by the fabric threads or wires. An electric heating element can be embedded in the catalyst body to raise the operating temperature. In addition to aluminum and/or magnesium silicate support substances, it has been found advantageous that elemental cobalt be present in an amount between 8-20% by weight, elemental magnesium in an amount of 6-20% by weight, elemental copper in an amount 1-10% by weight, and platinum and palladium in an amount of 0.05-5% by weight.
APTIC-25553

CATALYTIC OXIDATION UNIT FOR DOMESTIC OVEN EXHAUST.
(General Electric Co., Schenectady, N. Y.) U. S. Pat. 3,536,457. 5p., Oct. 27, 1970. 9 refs. (Appl. Feb. 21, 1968, 2 claims).
Wayne L. Henderson.
Identifiers: *Domestic ovens, *Catalytic afterburners, *Design criteria, Odors, Smokes, Catalytic oxidation, Odor counteraction, Combustion air, Carbon dioxide, Non-industrial emission sources.

A catalytic oxidation unit is described that eliminates smoke and odors issuing from the exhaust vents of domestic cooking ovens, particularly the high-temperature, self-cleaning ovens using a pyrolytic process for degrading food soils. The unit comprises a hollow housing supporting catalyst-coated gas burners of cellular ceramic construction and having a high surface-to-volume ratio. The housing has an intake port and an exhaust port and includes a partition which separates the housing into intake and afterburner compartments. Gas flow is directed from the oven cavity to the intake compartment, then through the catalyst-coated gas burners to the afterburner compartment, and finally to the exhaust port. Primary combustion air can be supplied to the intake compartment, while secondary combustion air can be supplied to the afterburner compartment to create afterburning of the oven exhaust. Complete degradation and conversion of gases to carbon dioxide is achieved since the velocity is automatically controlled and they are exposed to high temperatures for a sufficient amount of time. (Author abstract modified)
APTIC-25554

WATER INJECTOR FOR ENGINE EXHAUST.
(Wagner Mining Scoop, Inc., Portland, Oreg.) U. S. Pat. 3,530,665. 3p., Sept. 29, 1970. 4 refs. (Appl. Aug. 26, 1968, 6 claims).
Eddie B. Wagner.
Identifiers: *Water injectors, *Engine exhausts, *Internal combustion engines, Smokes, Automotive emission control, Design criteria, Cooling.

Water injectors for cooling and washing exhaust gases of internal combustion engines have been elaborate and expensive, involving modifications of the exhaust system. They have also been characterized by many small orifices that become quickly clogged with exhaust deposits. The inexpensive and trouble-free injector of the present invention is made as a simple flange fitting which is interposed between the exhaust manifold and exhaust pipe. The fitting contains a water injector tube with a single nozzle and a conical deflector that forms a conical spray curtain across the path of the exhaust gases. Some of the water is vaporized, reducing the temperature of the gas and the exhaust pipe; the unvaporized water washes smoke and other solid particles out of the gas stream. The deflector shields the nozzle against deposits in the exhaust gas.
APTIC-25557

FLARE STACK BURNER ASSEMBLY.
(Zink (John) Co., Tulsa, Okla.) U. S. Pat. 3,539,285. 4p., Nov. 10, 1970. 3 refs. (Appl. March 20, 1969, 2 claims).
John Smith Zink, and Robert D. Reed.
Identifiers: *Smokes, *Stacks, *Design criteria, Stack gases, Afterburners, Process modification, Combustion, Steam.

A burner assembly for the combustion of waste gases at the upper end of a flare stack is described. Steam is used as the smoke suppressant and also supplies energy for aspirating devices which induce air to be mixed with steam. Nozzles are provided to deliver this mixture to the combustion zone from a plurality of zones so that the mixture of steam and air is distributed throughout the flared gas. The thorough mixing of steam and air results in substantially smokeless combustion.
APTIC-25558

SELF-SEALING AND SELF-HOLDING FILTER FRAME.
(Assignee not given.) U. S. Pat. 3,538,686. 3p., Nov. 10, 1970. 10 refs. (Appl. Oct. 21, 1968, 5 claims).
Louis Schwab.
Identifiers: *Design criteria, Bag filters, Maintenance.

Filter assemblies comprising bag filters secured to rigid frames are used to filter dust and other particles from dust-laden air. They are mounted in holding frames or ducts, and must be frequently detached for cleaning or replacement. It is desirable that the assemblies be slid into and out of operational position without tightening or loosening of fastening means and also without skilled labor. The present invention accomplishes these objectives by providing the filter frame with laterally protruding flaps that frictionally grip the walls of a holding frame or duct. The assembly is detached by simply pulling the frame out of position. Because production costs are so low, disposal of the assembly is economically feasible.
APTIC-25559

RECOVERY OF SO2.
(Grace (W. R.) and Co., New York) U. S. Pat. 3,538,681. 3p., Nov. 10, 1970. 2 refs. (Appl. Dec. 5. 1968, 6 claims).
Robert R. Cantrell, and Forrest P. Wiley.
Identifiers: *Dimethyl sulfoxide, *Absorption (general), Stack gases, Electric power production, Organic sulfur compounds.

A method is described which will remove sulfur dioxide from a gas stream even when it constitutes only a very small percentage of total gas flow. It involves the absorption, at 24 to 34 C, of SO2 by dimethyl sulfoxide (DMSO) in a typical countercurrent gas-liquid contact column. Subsequently, the SO2 is desorbed from the DMSO-SO2 mixture, at 40 to 90 C, by contacting the mixture with alumina or other suitable absorbent. Since the method has the potentiality for removing at least 99% of the SO2 from flue gases, it will enable power stations to continually burn cheap sulfur-containing fuels.
APTIC-25560

AIR POLLUTION CONTROL DEVICE FOR ENGINES.
(Assignee not given.) U. S. Pat. 3,530,649. 3p., Sept. 29, 1970. 10 refs. (Appl. June 28, 1968, 3 claims).
Fred W. Porsch, Chester M. Shelton, and Lawrence O. Dove.
Identifiers: *Baffles, *Filters, *Automotive emission control, Engine exhausts, Combustion gases, Settling particles, Soot, Internal combustion engines, Automobiles, Design criteria.

A device for controlling pollution from the exhaust gases of automobiles is described. The device consists of a tubular casing having an inlet and for attachment to the exhaust outlet of an engine. Within the casing adjacent the inlet end is a first transverse baffle or wall having a plurality of apertures adjacent its outer edge through which the waste products of combustion such as exhaust gases and soot pass. This first baffle has a central indentation to cause an agitation and ignition of the waste products. A second transverse baffle or wall is disposed between the first baffle and a filter, and a forwardly extending cone-shaped wall is secured to the second baffle. This cone-shaped wall is arranged to produce further agitation in the waste products of combustion. The second baffle is provided with an enlarged central opening through which the waste products of combustion pass on their way to the filter. The filter is of a type to remove the solid particles from the gases and also to remove obnoxious gases if desired. (Author abstract modified)
APTIC-25566

SEPARATION EFFICIENCY OF ROOM AIR STERILIZATION EQUIPMENT COMPARED WITH DUST PARTICLES OF DIFFERENT SIZES.
(Abscheideeffektivitaet einer Raumluft-Entkeimungsanlage gegenueber Staubpartikeln unterschiedlicher Groesse). Text in German. Z. Ges. Hyg. (Berlin), 16 (10):775-780, Oct. 1970. 5 refs.
Kurt Laudien, and Gerhard Schmidt.

Identifiers: *Air conditioning equipment, Germany, Buildings, Microorganisms, Aerosols, Dusts, Particle size, Filters.

The room air sterilization equipment produced by the GDR-works Myton was tested by means of a light scattering particle counter as to its efficiency for removing dust from rooms. The correlation between the numeric aerosol concentration in the experimental room and the operating duration of the equipment resulted in an equation involving the initial aerosol concentration and a constant. Experimental data which had been found by other authors about the elimination of micro-organisms by such equipment are subject to this law too. After 60 mim there results an aerosol level which does not change any more during the further operation of the equipment and which meets the purity requirement put to dust-poor rooms of category 100,000 according to US Federal Standard Nr. 209.
APTIC-25568

METHOD FOR DEPOSITING PARTICLES.

(Thiokol Chemical Corp., Bristol, Pa.) U. S. Pat. 3,540,587. 5p., Nov. 17, 1970. 2 refs. (Appl. April 2, 1969, 10 claims).
Henry D. Dawbarn.
Identifiers: *Screen filters, Deposition, Plastics, Dusts, Winds, Snow, Fluid flow.

A method is disclosed for depositing particles from a fluid stream which comprises suspending in the path of the fluid an integral unitary thermoplastic sheet which is made of a substantially unoriented thermoplastic film reinforced, generally in two directions, with oriented thermoplastic filaments. The thermoplastic sheet and filaments are preferably polyolefins and the sheet is reinforced on both sides. An application would be the use of the sheet in panels interconnected by the filaments, though separated, as an inexpensive snow fence of beach erosion prevention device, wherein the fluid such as substantially passes through the fence while depositing particles such as snow, sand or dust and the like at the fence, while the fluid, emptied of the particles passes through. Plastic films have been utilized for this purpose previously, but they have a tendency to tear quite easily. The fence described as strong enough to perform without adverse effects. (Author abstract modified)
APTIC-25569

BURNER MEANS FOR ELIMINATING SMOKE.

(Assignee not given.) U. S. Pat. 3,538,865. 14p., Nov. 10, 1970. 19 refs. (Appl. May 26, 1969, 17 claims).
Jerry S. Lausmann.
Identifiers: *Smokes, *Incineration, *Flame afterburners, Wood, Combustion products, Paper manufacturing, Design criteria, Temperature.

A device for eliminating the smoke arising from incomplete combustion of wood waste products is described. The device consists of a tepee burner which have the ability to concentrate at the burner axis the particulate matter which is produced in the combustion process and to collecting and draw off the axial column of particle bearing gases while allowing the clean peripheral combustion gases to be discharged into the ambient air. Ducts return particle bearing gases to the lower portion of the burner where fans inject the gases into the burner through a wall of flame to incinerate much if not all of the particulate matter; the injection is carried out so as to aid the concentration of the particulate matter in the axial columnar portion of the rising combustion gases. Control means are provided for regulating the temperature of the returning combustion gases in relation to the temperature at the tepee outlet so as to maintain the temperature of the burning pile at or near an optimum value thus decreasing the amount of particulate matter produced in the combustion process. Previous burners pollute the atmosphere with smoke because of incomplete combustion; the device described controls that pollution. (Author abstract modified)
APTIC-25570

FILTER FRAME SEAL.

(Flanders Filters Inc., Riverhead, N. Y.) U. S. Pat. 3,529,406. 3p., Sept. 22, 1970. 8 refs. (Appl. Aug. 9, 1968, 1 claim).
Adrian R. Allan Jr., and Martin R. Fink.
Identifiers: *Seals, *Filters, Bacteria, Dusts.

A filter structure used to supply virtually dust and bacteria-free air to critical production or laboratory areas is described. The device consists of a filter having a channel about its front periphery which is filled with a fluid of relatively high consistency. The channel is adapted to receive a mating retainer when the filter is positioned in its supporting housing, whereby the retainer is frictionally and sealably engaged by the fluid in the filter channel. Previous high-efficiency filter structures depend upon a gasket and clamp arrangement to seal them. The gasket is susceptible to leakage after periods of wear, and the clamping mechanism can be damaged in a number of ways, thus allowing leakage. The filter structure described herein prevents accidental leaks of even the smallest amount, thus making it desirable for critical area use.
APTIC-25571

DE-ENTRAINMENT IN PLATE COLUMN.

(Takohanto ni yoru dohanhimatsu no jokyo ni tsuite). Text in Japanese. Kagaku Kogaku (Chem. Eng.), 34 (4):421-426, 1970. 18 refs. (Proceedings of the Society of Chemical Engineers, Second Autumn Meeting, Nagoya, Japan, Oct. 13, 1968.)
Kazukuni Shimoura, Akira Kanagawa, and Tenson Tsutsui.
Identifiers: *Operating variables, *Scrubbers, Japan, Mists, Water, Steam, Flow rates.

De-entrainment characteristics of a perforated-plate column 124 mm in diameter and five plates were studied experimentally in a steam-water system. The de-entrainment coefficient of a perforated plate, the calculation of the probability of passage of entrained mist through the plate, the measurement of de-entrainment characteristics, the entrainment rate formed in the nth plate, and the relationship between the decontamination factor and the upper plate liquid concentration are discussed. The results illustrate that more than 95% of the entrainment is removed in the bottom plate of the column. De-entrainment efficiency of each plate above the bottom one has a considerably lower value than that of the bottom plate, for the bulk of the entrained mist passing through the first plate also passes through the other plates in sequence. Steam rate from 500 to 250 Kg/ sq m - h, plate spacing from 10 to 30 cm, and entrainment rate per unit steam rate from 0.0001 to 0.01 were adopted as variable ranges.
APTIC-25573

CAN EMISSIONS BE REDUCED"

(Kan utslippene reduseres"). Text in Norwegian. Tek. Ukleblad (Oslo), 115 (12):259-262, March 21, 1968. 5 refs.
Helge Fredriksen.
Identifiers: *Electric power production, *Desulfurization of fuels, *So2 removal (combustion products), Costs, Europe, Combustion gases, Soot, Fuel oils, Domestic heating, Stacks, Air quality measurements, Settling chambers, Scrubbers, Catalytic oxidation, Gravity settling, Fuel oil preparation, Absorption (general), Alkalized alumina (adsorption), Manganese dioxide (japanese), Reinluft process (adsorption), Sulfuric acid, Calcium compounds, Magnesium compounds, Sulfur dioxide, Sulfur trioxide.

The output of Norwegian hydroelectric plants, which was 49 billion in 1965, supplies about one half of the nation's electric power requirements, so that it is necessary to resort to organic fuels to meet the quota. The sulfur content of fuel oil present problems due to the emission of sulfur dioxide. The heavier the oil, the higher its sulfur content. In the Oslo area, a number 6 oil is sold that has only 2.5% S, but this is more expensive than the high-sulfur oil. Domestic heating must use about 15% of the heavier oils (number 3, number 5, number 6) while industry must make use of about 25% of the lighter oils (number 1 and number 2). It has been calculated that the total SO2 emission resulting from the burning of fuel oils amounts to 120-130 million kg annually (1966). The heavier oils account for about 90% of this figure. Domestic heating is responsible for about 25 million kg, or 20% of the total SO2 emission figure. From 2 to 4% of the fuel-oil sulfur is emitted in the form of SO3, which tends to combine with atmospheric moisture to form sulfuric acid. A Swedish study has shown that particulate matter can contain 10-30% by weight of this sulfuric acid. A summary is given, from the literature, of the various procedures used for reducing sulfur oxide emissions, including chimney height, desulfurizing fuels, use of binders such as limestone and dolomite as additives to fuel, scrubbers, gravity precipitators, the Reinluft process, alkalized alumina, activated manganese oxide, and catalytic oxidation. The economics of desulfurization are also discussed.
APTIC-25584

SOME EXPERIMENTS FOR CONTROLLING OF NITROGEN OXIDES IN DIESEL ENGINE EXHAUST GAS.

(Diiseru haikigasuchu no chissosankabutsu no hassei yokusei ni tsuite no nisan no jikken). Text in Japanese. Nenryo Kyokaishi (J. Fuel Soc. Japan, Tokyo), 48 (504):241-250, 1969. 10 refs.
Nobuyuki Kita, and Yoshiya Fuse.
Identifiers: *Engine exhausts, *Diesel engines, *Control methods, *Nitrogen oxides, Japan, Air-fuel ratio, Timed fuel injection, Carbon monoxide.

A small high-speed Diesel engine was used to investigate the effectiveness of three methods of controlling nitrogen oxides (NO (x)) in the exhaust gas, in addition to measuring the power output, smoke contamination, and carbon monoxide. The three methods were exhaust recirculation, intake throttling and injection timing. Under standard contitions, the concentration of NO (x) varies in the range of 180-550 ppm, and, in general, the larger the load, the higher the concentration. The concentration also increases with the rise in rpm, but it reaches the peak at 1200 rpm and declines thereafter. The ratio of NO2 concentration to NO (x) concentration decreases with the load increase, and the influence of the rpm is small. By recirculating a part of the exhaust gas NO (x) can be controlled without reduction of horsepower (HP) or increase in carbon monoxide output. For example, at 3/4 -1/2 load, the method cuts down NO (x) concentration to about 1/2-1/3 of the original value. Intake throttling (increasing the load pressure) has some effect, but at high load, there is an undesirable effect on the HP. Lagging the injection timing by about 6 degrees behind the standard condition has a little effect on NO (x) and has no bearing on the HP.
APTIC-25587

NEW DUST REMOVAL METHODS IN THE TOBACCO INDUSTRY.

(Neue Wege zur Entstaubung in der Tabakindustrie). Text in German. Wasser Luft Betrieb, 12 (4):209-212, 1968.
H. Barth.
Identifiers: *Tobacco, *Industrial emission sources, *Centrifugal separators, Germany, Dusts, Operating variables, Filters, Design criteria, Flow rates.

A dust removal method using the Amerclone GA centrifugal separator which permits the recycling of the atmosphere in tobacco plants is described. The machine differs from the usual cyclone type in that it has a primary and a secondary system. The primary system consists of 725 mm long and at the widest part 100 mm wide cast iron G-pipes of partly conical, partly cylindrical shape. The polluted air enters through slots in the conical part, the dust is separated by centrifugal force with the help of a central tube, the purified air then reaches

the secondary system consisting of a 390 mm long 100 mm wide pipes where the residual dust is separated also by centrifugal force. The airstream in this dust separator is not reversed as it is in the common cyclonic cleaners which causes some of the already separated dust particles to reenter the airstream. This combination system operates economically with airstreams exceeding 10,000 cu m/h; installed in tobacco plants the dust separating efficiency reached 99%. When recycling of the air is desired, then dust concentrations of 4 mg/cu m are too high and an air filter for fine-mesh filtering is coupled to the multicyclone at the outlet side. Such fully automatic roller conveyor filters with porous paper as a filter will purify tobacco-dust laden air up to a concentration of 5 mg/cu m.
APTIC-25588

TRAIL SOLVES ITS SULPHUR PROBLEM.

Chem. Met. Eng., 45 (9):483-485, Sept. 1938. 2 refs.
S. D. Kirkpatrick.
Identifiers: *By-product recovery, *Absorption (general), *Sulfur compounds, Canada, Coke, Primary metallurgical processing, Packed towers, Sulfuric acid, Ammonium compounds, Iron compounds, Zinc compounds, Sulfites.

The iron and zinc concentrates used at the Trail Smelter average about 400 tons of sulfur per day, which when roasted yield gases containing from 0.7 to 6.8% sulfur dioxide. In the past, all but 10% of the sulfur had been recovered as sulfuric acid for use by the company's fertilizer plant. Now an elementary sulfur recovery plant has been built to recover the remaining sulfur. In essence, this sulfur recovery process consists of absorbing the SO2 from the roaster gases in ammonium sulfite solution from which it is eliminated as 100% SO2 by treatment with concentrated sulfuric acid. Pure SO2 is then reduced by incandescent coke to elemental sulfur which is refined to 99.99% brimstone, that is sold to the paper and pulp industry and to farmers for crop dusting. Equipment used in the process includes lead towers, packed with wood-plank for absorption of SO2; iron plate-and-frame filter presses for removing any solids carried over from the roasters; and lead towers, packed with acid-proof brick, for eliminating SO2 from the absorbing solution. The coke-fired reduction furnace is essentially a gas producer in which large amounts of carbon oxy-sulfide are formed. To convert the carbon oxy-sulfide to sulfur and carbon dioxide, exit gases from the reduction furnace are passed to a catalyst column where the reducing reaction is completed. The gases are then cooled, most of the sulfur condensed as a liquid, and what is remaining is precipitated as a mist in Cottrell treaters.
APTIC-25589

A PROGRESS REPORT ON CONTROLLING ATMOSPHERIC POLLUTANTS.

J. Air Pollution Control Assoc., 7 (4):302-307, Feb. 1958. (Presented at the Air Pollution Control Association, 50th Annual Meeting, St. Louis, Mo., June 2-6, 1957.)
Gordon P. Larson.
Identifiers: *Control equipment, Dusts, Fumes, Fluorides, Hydrocarbons, Sulfur dioxide, Gases, Vapors.

A review of the air pollution control activities in 1957 shows an impressive record of 6 million dollars expended in research, over 200 governmental agencies assigned some measure of responsibility for clean air in their communities, and annual sales in control equipment and engineering services in excess of 100 million dollars. This article discusses the state of the art of controlling sulfur dioxide emissions from smelters and refineries; dust and fumes, particularly those produced by metallurgical processes; organic vapors and gases, including hydrocarbons; fluorides from aluminum and phosphate fertilizer plants; and the three basic engineering methods that can be applied to reduce aerosols, vapors, and gaseous contaminants. Tables are presented which classify various types of collectors and control devices in relation to the processes and emissions. They also show the great number of systems to be considered and some of the advantages and disadvantages of each device. To a large extent, most of these installations are custom engineered and built on the site. The costs cover a broad range. As indicated by recent health studies, there is need for maximum controls on all forms of pollution for which solutions are known. These studies also point up the need to develop control measures for hydrocarbon emissions from industry and motor vehicles.
APTIC-25590

THE CONTROL OF ORGANIC SOLVENTS.

For primary bibliographic entry see Field 01.
APTIC-25592

PROTECTION OF ENVIRONMENT.

For primary bibliographic entry see Field 04.
APTIC-25593

GASSING....THE BUG-A-BOO OF THE BUS BUSINESS.

For primary bibliographic entry see Field 03.
APTIC-25594

IMPROVEMENTS IN OR RELATING TO DEVICES FOR CLEANING EXHAUST GASES.

(G. A. Messen-Jaschin, Sarnen, Switzerland) Brit. Pat. 1,179,885. 5p., Feb. 4, 1970. (Appl. May 5, 1967, 8 claims).
Personal Author Not Recorded.
Identifiers: *Engine exhausts, *Internal combustion engines, *Electrostatic precipitators, *Ionization, Europe, Particulates, Hydrocarbons, Carbon monoxide.

The catalytic combustion chambers that have been proposed to eliminate carbon monoxide from exhaust gases of internal combustion engines really constitute ovens or furnaces because of the large quantities of heat they develop. They can be employed only in a few rare instances. Similarly, known electrostatic filters for removing hydrocarbons and solid and liquid particles from exhaust gases are so large that they can be used only on diesel locomotives, or in static installations. The electrostatic filter and related equipment of the present invention provides for reliable, continuous exhaust gas cleaning. The invention includes a cylindrical collecting electrode, a plurality of ionizing electrodes projecting radially about a shaft located within and coaxial with the collecting electrodes, and means for maintaining an electric potential between the collecting and ionizing electrodes. The electrostatic filter is used in conjunction with a preliminary chamber where the hot exhaust gases are first expanded and precooled and where they drive a turbine that rotates the shaft. Solid particles can be deposited in a cyclone prior to entering the ionizination chamber, where, due to the expansion of the gases, ionization is virtually unipolar. Further expansion, with consequent additional cooling, takes place in the ionization chamber to which fresh air is also admitted. The gas is cooled to such an extent that hydrocarbon gas is condensed, and the resultant condensate films are agglomerated to droplet form as a consequence of the radial infusion of fresh air. These droplets are ionized as the gases pass through the collecting electrodes. Carbon monoxide, which cannot be precipitated on the filter since it does not condense at normal temperature, is rendered harmless by adequate dilution with fresh air.
APTIC-25599

APPARATUS FOR EFFECTING INTIMATE CONTACT BETWEEN A GAS AND A LIQUID.

(Aktiebolaget Svenska Flaktfabriken, Nacka (Sweden)) Brit. Pat. 1,178,502. 4p., Jan. 21, 1970. (Appl. Feb. 9, 1968, 5 claims).
Personal Author Not Recorded.
Identifiers: *Gas-liquid contact, *Floating beds, *Absorption, Sweden, Dusts, Scrubbers, Heat transfer, Physical states, Gases, Liquids.

Gas absorption, dust separation, and heat transfer processes depend to a large extent on bringing a liquid-phase medium and a gas-phase medium into intimate contact with one another. To achieve this contact there must be a large effective contact surface between the two media and also a high relative speed between the two media. When the contact surface is extended by inserts such as Raschig rings and the use of nozzles to atomize the liquid, the maximum gas speed is limited substantially by the carry-away of the liquid and the pressure drop on the gas side. When floating beds are used, the relative speed between gas and contact bodies is increased but, due to the gas speeds applied, liquid that is supplied in a counterflow tends to be carried out of the apparatus with the gas. If gratings are provided above the bed for the removal of the liquid drops, there is an increase in pressure drop and thus an increase in power consumption. Such installations also require greater capital since in many cases they must be constructed from a corrosion-resistant material. The present invention eliminates this disadvantage of floating beds by locating a bed of light-weight spherical bodies between an upper and lower grating. Gas is directed upward through the bed at a speed so adjusted that the contact bodies are kept moving. Since the liquid is supplied below the floating bed in a flow concurrent with the gas, the upper layer of the bed operates as a liquid-drop removal means at the same time as it constitutes part of the contact surface. For this reason, the application of the invention is profitable both with respect to operating costs and initial costs.
APTIC-25600

EQUILIBRATION AND STEAM-REFORMING CATALYSTS.

(Esso Research and Engineering Co., Elizabeth, N. J.) Brit. Pat. 1,129,702. 4p., Oct. 9, 1968. (Appl. Oct. 13, 1966, 13 claims).
Personal Author Not Recorded.
Identifiers: *Engine exhausts, *Combustion gases, *Catalytic oxidation, *Catalysts, United states, Fuels, Hydrocarbons, Carbon monoxide.

The invention relates to sulfur-resistant equilibrium catalysts useful for catalyzing steam-hydrocarbon reforming and reactions for removing pollutants from fuel-combustion products, e.g., auto exhaust gases. The term equilibration catalysts is applied because the product distribution attained is largely determined by the equilibria involved in certain reactions to be catalyzed: steam reforming of hydrocarbon molecules to produce hydrogen and carbon oxides and 'water gas shift' of carbon monoxide and water to form CO2 and H2. The catalysts of the invention are prepared by coprecipitating nickel, aluminum, copper or zinc, and chromium as hydroxides, carbonates, or basic carbonates, which on calcination in the presence of oxygen or air form mixed oxides. Before calcination, the coprecipitated metal hydroxides, carbonates, or basic carbonates are impregnated with a salt of a promoter metal such as barium that is decomposed to its oxide by the calcination. The resulting catalyst, in which the mixed oxides are dispersed, is treated with hydrogen before use to reduce a major portion of the nickel oxide to nickel metal. The catalyst is made to contain 18 to 35 wt % NiO before pretreatment with hydrogen. Gases to be treated can be passed over the catalyst under widely varying conditions, e.g., space velocities of 100-20,000 (STP) volumes per volume of catalyst per hr, temperatures of 300-1600 F, and pressures of 0-500 psig.
APTIC-25601

METHOD AND APPARATUS FOR MINIMIZING AIR POLLUTION.

(Combustion Engineering, Inc., Windsor, Conn.) Brit. Pat. 1,180,568. 7p., Feb. 4, 1970. (Appl. Feb. 24, 1967, 8 claims).
Personal Author Not Recorded.

Identifiers: *Alkaline additives, *Heat transfer, United states, Stack gases, Steam plants, Scrubbers, Combustion, Temperature.

One of the many sources of air pollution is the flue gases emitted from fuel burning equipment such as steam generating units. The sulfur dioxide and sulfur trioxide in such gases are a major concern as air pollutants. The particulate matter such as fly ash and other dust particles also contribute to pollution if not completely recovered. The schemes that have been developed to date to remove these obnoxious flue gas constituents have involved either high capital costs and/or high operating costs. The present invention provides a method and apparatus for economically removing the pollutants. According to the invention, inexpensive pulverized limestone or dolomite are added to the flue gas stream to produce harmless materials that are readily removed by subsequent wet scrubbing. After being scrubbed, the flue gases are reheated to raise their temperature so that no visible vapor plume is emitted, or localized air pollution caused by low-temperature, nonbuoyant gases issuing from the scrubber. Reheating is accomplished by introducing into the scrubbed gases one portion of a subdivided air stream, the temperature of the portion being higher than the temperature of the scrubbed combustion products. The other portion of the preheated air is used to form the hot air-fuel mixture for combustion. By eliminating the need to place a heat transfer surface area in the path of flue gas coming from the scrubber, the direct reheating considerably reduces capital expenses.
APTIC-25602

APPARATUS FOR PURIFYING FLUE GASES.

(Aktiebolaget Bahco, Stockholm (Sweden)) Brit. Pat. 1,171,955. 6p., Nov. 26, 1969. (Appl. March 7, 1966, 6 claims).
Personal Author Not Recorded.
Identifiers: *Absorption (general), Sweden, Stack gases, Spray towers, Hydroxides.

An effective and economic method of removing sulfur dioxide from flue gases has long been sought so that corrosion, poisoning of vegetation, and formation of smog can be prevented. While it is possible to adsorb SO_2 on solid substances having large specific surface areas, the soiling of the materials by soot and steam would entail a regular exchange system and special servicing and maintenance procedures. To remove sulfur from fuel oil during refining operations would cause the cost of fuel oil to rise sharply. A third method for removing sulfur impurities arises from the fact that SO_2 is easily absorbed in alkaline aqueous solutions. Two problems, however, are associated with this method; namely the problem of obtaining sufficient contact surface area between the alkaline treatment agent and the SO_2-containing gas, and the problem of maintaining a period of contact sufficient to give substantially 100% absorption. The apparatus of the present invention obtains a wide contact area through an arrangement in which liquid is atomized by allowing the gas to impinge on the surface of the processing agent at high speeds. The gas then carries the fine liquid droplets up through a vertical processing duct, the lower end of which terminates immediately above the surface of the liquid and in which the absorption is effected. The required contact time is provided by reducing the speed of the gas during its passage through the vertical duct, which is designed as a diffuser. In this way a considerable portion of the kinetic energy of the gas supplied to atomize the liquid is recovered. Suitable alkalies are sodium hydroxide and calcium hydroxide.
APTIC-25603

METALLURGICAL SMOKE.

Bull. Bureau Mines, no. 84:7-94, 1915. 44 refs.
Charles H. Fulton.
Identifiers: *Stack gases, *Primary metallurgical processing, *Control methods, Litigation, Plant damage, Fumes, Smokes, Stacks, Settling chambers, Electrostatic precipitators, Bag filters, Absorption (general), Alkaline additives, Design criteria, Sulfuric acid, Sulfur trioxide, Flow rates.

The problem of metallurgical smoke (defined as gases and vapors, and the fine dust entrained by them) that issues from stacks of smelting and ore roasting plants is considered. Sulfur dioxide and trioxide are two of the major gases in this case. They can combine with atmospheric water to form sulfuric and sulfurous acid. The dust that is carried by the gases consists of small particles of the different ores, fluxes, or fuel. These emissions can, when combined with certain meteorological conditions, cause extensive plant damage, as well as injury to animals and humans. The physical and chemical properties governing the actions of stack emissions are discussed. The effect of the effluent flow speed on the composition of the flue dust is considered, and design practices for dust chambers and stacks are related. Methods for the control of dust emissions include settling chambers, bag-houses, and electrostatic precipitation. Several operating examples of these controls are presented. Several processes for the removal of SO_2 from stack gases and its conversion to H_2SO_4 are given, including absorption and alkaline additives. Some legal aspects of smelter emissions problems are discussed in terms of actual litigation.
APTIC-25605

COMBATTING THE EFFECTS OF SMOG ON WIRE-SPRING RELAYS.

For primary bibliographic entry see Field 09.
APTIC-25606

PRELIMINARY EVALUATION OF CEMENT DUST FROM ELECTROFILTERS AS A POTASSIUM FERTILIZER.

(Wstepne doswiadczenia nad wartoscia pylu cementowego z elektrofiltrow jako nawozu potasowego). Cement, Wapno, Gips, 11 (3):57-62, March 1955. 9 refs. (Translated from Polish by M. Radziwill, Centralny Inst. Informacji Naukowo-Technicznej i Ekonomicznej, Warsaw (Poland), 14p., 1961. NTIS: OTS 60-21237
T. Litynski, H. Jurkowska, and E. Gorlach.
Identifiers: *Cements, *Mineral processing, *Fertilizing, *Electrostatic precipitators, *By-product recovery, *Potassium compounds, Plant growth, Europe, Dusts, Collectors, Filters, Calcium compounds.

The use of the dust precipitated by electrofilters in the production of cement was investigated as a source of potassium for agricultural fertilizers. The dust has a high calcium but low potassium level; however, the potassium is highly soluble in water and dilute acids. Experiments were performed on pot cultures of sunflowers and Italian rye-grass with three fertilizer combinations: no potassium dressing, potassium in the form of chloride, and potassium in the form of electrofilter dust. Preliminary results indicate that the cement dust is an adequate source of potassium for these two plants although further pot and field tests are required. The dust not only showed no noxious effect on the plants from the high aluminum content, but some of its constituents (calcium, silica, trace elements) appear to have a beneficial effect on plant development and yield, and it can be considered a calcium as well as a potassium fertilizer. Leaching and crystallization may be necessary to increase potassium concentration. It is concluded that all cement plants should be equipped with adequate dust-collecting equipment, since it appears that the large cement industry in Poland could supply much of her potassium needs and thus reduce imports of potassium salts.
APTIC-25609

PROCESS FOR SEPARATING SULPHUR DIOXIDE FROM GAS MIXTURES AND APPARATUS THEREFOR.

(Assignee not given.) Can. Pat. 212540. 12p., July 19, 1921. (Appl. date not given, 6 claims).
Ralph Harper McKee.
Identifiers: *Adsorption (general), United states, Dusts, Scrubbers, By-product recovery, Catalytic oxidation, Design criteria, Sulfuric acid, Silicon compounds, Heat transfer, Cooling, Water, Thermal radiation.

A process is described which consists of bringing gases which contain sulfur dioxide to a cool and substantially dust-free condition, the moisture content being distinctly below saturation, then bringing the gases into contact with a silica gel of suitable adsorptive qualities. To cool the gases and remove the suspended dust, they are first thoroughly scrubbed with water, and then further subjected to the action of water-cooled surfaces and a scrubbing with sulfuric acid to both cool them and remove the water vapor. When the adsorbent has reached the point where it no longer acts effectively, the gas mixture is shunted to a chamber containing fresh adsorbent and the sulfur dioxide is removed from the saturated gel in substantially pure form by the use of reduced pressure and heat.
APTIC-25614

ADSORPTION OF HYDROCARBONS ON GRAPHITIZED CARBON.

Trans. Faraday Soc., 63 (530):455-460, Feb. 1967. 17 refs.
S. E. Hoory, and J. M. Prausnitz.
Identifiers: *Hydrocarbons, *Reaction kinetics, *Graphite, *Adsorption., Adsorption, Mathematical analyses, Thermodynamics, Pressure, Temperature.

Experimental results are reported for monolayer adsorption of ethylene, ethane, propylene, propane, isobutane, and n-butane on homogeneous graphitized carbon. The adsorption isotherms were determined by a manometric method, while the pressure measurements were made directly with a fused-quartz precision pressure gauge. The data were reduced with a two-dimensional van der Waals equation. Henry's constants, lateral interaction parameters, and heats and entropies of adsorption were calculated. The date indicate that for the larger hydrocarbons there is a decrease in rotational entropy of 2-4 cal/mole deg. due to hindered rotation on the surface. At normal temperatures, hydrocarbons are adsorbed on graphitized carbon in a 'lying-down' rather than in a 'standing-on-end' position. (Author abstract modified)
APTIC-25621

ODOR CONTROL WITH CHLORINE CUTS COST.

Water Sewage Works, 114 (12): 469-470, Dec. 1967.
Paul Desiderati.
Identifiers: *Chlorine, *Hydrogen sulfide, *Sewage, *Odor counteraction, Samplers, Fluid flow.

Chlorination was selected for odor control of hydrogen sulfide coming from sewage at the entrance of a wet well and at the effluent weir of the primary settling tank. On the basis of experience gained by running chlorine demand tests, the chlorine required for any given situation is indicated to be inversely proportional to the flow. The results of chlorine application for odor control was further demonstrated by taking grab samples during the day when the flow was 30,000 gph. Hydrogen sulfide tests were made to determine the effectiveness of odor control. Physical layout of the system which includes two 150 lb chlorine gas cylinders is described.
APTIC-25623

CONTROL DEVICES.

Arch. Environ. Health, 2 (5):568-570, May 1961.
Karl M. Richards.
Identifiers: *Combustion, *Blowby, *Smog, *Automotive emissions, Engine exhausts, Crankcase emissions, Automotive emission control, Hydrocarbons, Photochemical reactions.

Based on the theory that photochemical smog results from a combination of unburned hydrocarbons and nitrogen oxides, vehicle manufacturers are now furnishing internal venting devices on all 1961 model cars offered for sale in California. It is estimated that 40% of total unburned hydrocarbons, including both exhaust and crankcase, can be halted by these devices, which route blowby gases back into cylinders where they are burned in the engine. Since the role of motor vehicles in types of air pollution other than photochemical smog is not known, further research is needed to determine whether the internal venting system will be effective in other parts of the country.
APTIC-25632

APPARATUS FOR CONTINUOUSLY MEASURING THE CONCENTRATION OF A GAS-MIXTURE COMPONENT.

For primary bibliographic entry see Field 03.
APTIC-25637

PROTECTION AGAINST IMMISSION.

(Immissionsschutz). Text in German. Rheinisch-
Westfaelischer Technischer Uberwach.-Verein
E.V., Jahresbericht, 1969:38-41, 1969.
Personal Author Not Recorded.

Identifiers: *Plans and programs, *State governments, *Emission standards, Air quality measurement programs, Control agencies, Air quality criteria, Operating criteria. Enforcement procedures, Regulations, Maximum allowable concentration, Equipment standards, Germany, Odors, Particulates, Dusts, Boilers, Blast furnaces, Cupolas, Solid waste disposal, Stacks, So2 removal (combustion products), Fluorine.

The five principles promulgated in the framework of an intensified air pollution control campaign by the state of Nordrhein-Westfalen and adopted also by the other West German states postulate that all polluters be identified and included in the pollution control program, that the atmosphere be kept as clean as possible and not as dirty as just about tolerable; that the costs of the program be born equally by all polluters so that no competitive advantages arise; that the polluters bear the cost of their pollution control measures and public funds be used only in special situations; and that air pollution control as a community responsibility requires the cooperation of all concerned. Thus, all polluters are subject to certification and must meet all prescribed maximal emission regulations pertaining to dust emission, SO2 emission, and other applicable regulations. Fluorine is emitted by brick factories in quantities between 30 and 300 mg/N cu m, by cupola furnaces in quantities between 4 and 280 mg N/cu m, by Siemens-Martin furnaces in quantities between 7 and 70 mg N/cu m, by fertilizer plants in quantities between 6 and 80 mg N/cu m and by plants manufacturing insulating wool in quantities between 0.4 to 3 mg N/cu m. Guidelines regarding the required height of smoke stacks, emissions by refuse incineration plants, supervision of pollutant concentration and emission of pollutants, control of emission by boiler plants, control of olfactory pollutants and of noise pollution are outlined.
APTIC-25638

CHARACTERISTICS OF ELECTROSTATIC PRECIPITATORS.

Colloq. Int. Cent. Nat. Rech. Sci., no. 102:229-253,
1961. 7 refs.
H. G. Trevor Busby, and K. Darby.

Identifiers: *Electrostatic precipitators, Great britain, Particulates, Corona, Voltage, Particle size.

A brief survey is given of the electrical theory for the forces acting on the charged particle in the precipitation field, and the exponential type of equation usually accepted in representing the performance characteristics of an electrostatic precipitator is also included. Theory does not satisfactorily explain the behaviour of the electrostatic precipitator with reducing particle size, as according to theory the effective migration velocity should be directly proportional to the diameter of the particle whereas in practice there is ample evidence that the precipitator is not unduly affected by the particle size. A second relationship probably exists between length of discharge electrode energised by each electrical set and effect migration velocity which would impose a further limitation on the use of equations. That it is possible to increase the effective migration velocity in a precipitator by increasing corona current density is shown to be only true under certain circumstances. Comparative test results for two metallurgical processes are given for the square section discharge electrode and barbed or controlled corona type electrode, both of which are commonly used in precipitation. For each electrode the migration velocity is roughly proportional to corona type electrode, both of which are commonly used in precipitation. For each electrode the migration velocity is roughly proportional to corona current density but there is no relationship between current density and effective migration velocity for the two electrodes. If the mechanisms of the precipitation plant is based on the assumption that the gas is turbulent enough to cancel out completely the effect of the migration velocity of the particles under the influence of the electrical field, such as would be indicated by the theoretical equations, then deposition of the dust would occur only when the motion of the gas brought the charged particle into close proximity to the collecting electrode. Such an assumption would probably explain why a precipitator will remove particles of dust from the gas stream almost independent of the size of the particle. Similarly the effect of increasing gas velocity causing greater turbulence, and the increase of corona current density causing greater disturbance of the gas through the effect of the electric wind could explain the effect of these factors on effective migration velocity, since with increasing motion of the gas up to certain limits the number of times the dust particle would be brought close enough to the collecting electrode to be deposited would increase. (Author abstract modified)
APTIC-25641

PROBLEMS OF ELECTRICAL PRECIPITATION REVIEWED.

Gas World, 134 (3494):98-104, Aug. 4, 1951. 5 refs.
W. Sykes, and F. Broomhead.

Identifiers: *Electrostatic precipitators, *Design criteria, Cements, Aluminum, Great britain, Particulates, Dusts, Fly ash, Boilers, Blast furnaces, Industrial emission sources, Chemical processing, Chamber processing, Contact processing, Kraft pulping, Metal fabricating and finishing, Mineral processing, Operating variables, Particle size, Maintenance, Sulfuric acid, Electrical properties.

Aspects of the design, construction, and operation of the electrical precipitator are discussed. The great advantage of this device is its ability to remove with high efficiency dust of particle size much smaller than that removable by mechanical or cyclone separators. Back pressure, and power needs to produce the corona discharge, a very small; however initial costs are much higher. Problems considered at length include removal efficiency and its relation to time contact of the gases in the field, design of the precipitation chamber, insulator breakdown, gas distribution across the precipitator, removal of deposits from electrodes, and electrical equipment requirements. Five essential design factors are given: correct time contact, good gas distribution throughout the fields, design and arrangement of the electrodes, maintenance of clean electrodes, and maintenance of correct voltage. Examples of the following typical application are described and the principal design features are indicated in each case to point up the great variety of constructions required by specific and differing operating conditions: detarring of producer gas from coal and coke, chamber and contact process sulfuric acid manufacture, aluminium and cement production, boiler flyash precipitation, gypsum dust removal, sodium sulfate recovery in the Kraft pulp industry, cleaning of blast furnace gas, air conditioning, and spray painting.
APTIC-25643

PROCESS FOR MANUFACTURING SULFUR FROM SULFUR OXIDES, USING CARBON MONOXIDE.

(Verfahren zur Darstellung von Schwefel aus
schwefliger Saeure mittels Kohlenoxyd). Text in
German. (Societe Anonyme Metallurgique
'Procedes de Laval', Brussels (Belgium)) Ger. Pat.
196,604. 1p., pub. date not given. (Appl. Sept. 4,
1904, 1 claim).
Personal Author Not Recorded.

Identifiers: *Carbon monoxide, *Reduction, *So2 removal (combustion products), Belgium, Combustion gases, By-product recovery, Sulfur compounds.

Sulfur oxides are introduced into the center of a round furnace chamber, and are passed across a stream of carbon monoxide gas at a tangential angle, so that the gases become intimately mixed. The carbon monoxide gas can also be generated within the furnace chamber by introducing a mixture of fuel and air in proportions conducive to the formation of CO.
APTIC-25649

PROCESS FOR OBTAINING ELEMENTAL SULFUR FROM THE WASTE GASES OF CARBON DISULFIDE MANUFACTURING.

(Verfahren zur Gewinnung von elementarem
Schwefel aus den Endgasen der
Schwefelkohlenstoff-Fabrikation). Text in
German. (Kali-Chemie A. G., Berlin (Germany))
Ger. Pat. 483,286. 2p., Sept. 28, 1929. (Appl. June
8, 1927, 1 claim).
Fritz Projahn.

Identifiers: *Carbon disulfide, *By-product recovery, *Catalytic oxidation, *So2 removal (combustion products), Carbon black, Germany, Combustion gases, Chemical processing, Organic sulfur compounds, Aluminum oxides, Silicates, Catalysts, Temperature.

Waste gases of carbon disulfide manufacturing are mixed with a suitable quantity of sulfur oxides (or gases containing them), heated to a high temperature (about 600 C), and passed over a catalyst such as bauxite, activated carbon, or silica gel. A portion of the sulfur content of the waste gases may also be burned in air to convert these to sulfur oxides, after which these SO2-laden gases are mixed with an appropriate quantity of the waste gases for conversion to elemental sulfur.
APTIC-25650

CONVERSION OF SULFUR DIOXIDE TO SULFUR TRIOXIDE.

(Ueberfuehrung von Schwefeldioxyd in
Schwefeltrioxyd). Text in German. (Emil
Baerwald, Berlin and Henryk Goldmann,
Wilhelmsburg, Germany) Ger. Pat. 537,763. 2p.,
Nov. 6, 1931. (Appl. Feb. 11, 1928, 4 claims).
Personal Author Not Recorded.

Identifiers: *Electrolysis, *So2 removal (combustion products), *Catalytic oxidation, Stone, Germany, Combustion gases, Electrostatic precipitators, By-product recovery, Design criteria, Carbides, Nitrogen oxides, Sulfur trioxide, Silicon compounds, Catalysts.

Conversion of sulfur dioxide to sulfur trioxide is effected by means of high-voltage electricity. The innovation consists of inserting into an electrode certain nonconducting substances, such as a piece of slate or silicon carbide, which upon contact with conditions in the reactor gives off oxides of nitrogen; these act as gaseous catalysts for the reaction. Tubular quartz insulators are inserted into the wall of the oxidation chamber; the leads bringing the electric power to the chamber run inside. The gases are introduced at the bottom of the

oxidation chamber, which is cylindrical in form, and the electrical current is introduced from both sides. An electrostatic filter device at the top of the cylinder draws the reaction products out of the chamber.
APTIC-25651

METHOD FOR THE REMOVAL OF FLUORINE FROM INDUSTRIAL GASES.

(Research Corp., New York, N. Y.) Brit. Pat. 752,883. 6p., July 18, 1956. 1 ref. (Appl. Feb. 8, 1954, 7 claims).
Personal Author Not Recorded.
Identifiers: *Stack gases, *Absorption, *Fluorine, Suspended particulates, Sintering, Collectors, Electrostatic precipitators, Calcium compounds, Oxides.

A method is described for the removal of fluorine from industrial gases, which comprises adding comminuted lime to a stream of gases, subjecting the lime-containing stream to vertical action, skimming off a portion of the gas containing an increased concentration of particulate matter, and returning this portion to the stream to be subjected to vertical action. The separation of solid matter from the remaining portion of the gases may be effected by electrostatic precipitation. In its particular application ot the removal of fluorine from gases in a sintering machine, the method may comprise recirculating a portion of the gases from which coarser suspended particles have been separated through the sintering machine and subjecting the other portion of the gases to the vertical action.
APTIC-25658

FLUE-GAS WASHING TRIALS AND CONCLUSIONS.

Mech. World Eng. Rec., vol. 68:88, 91, Jan. 25, 1935.
W. E. J. Beeching.
Identifiers: *Stack gases, *Spray towers, Great britain, Dusts, Electric power production, Operating variables, Pilot plants, Baffles, Sulfur compounds.

Flue gas washing efficiency in removing dust and sulfur during power station working conditions is considered. An experimental plant is described with four sprinklers in each of two towers, and a baffle at the base of a transverse chamber which separates the effluent water from the two towers. Results and observations concerning efficiency are presented tabularly. Tests were also conducted on samples of cement and dust in various proportions and the results compared with mixtures of cement and sand. It is proposed to deepen all thermometer pockets, and if necessary fill them with water. Rather than keep the flow restricted and reduce the size of the nozzle in the second venturi meter, it is also proposed to divert one of the pipes. Pitot readings are to be checked by the introduction of an anemometer. Further modifications are indicated.
APTIC-25663

IMPROVEMENTS IN OR RELATING TO DUST TRAPS FOR USE IN THE EXAMINATION OF DUST-LADEN GAS.

For primary bibliographic entry see Field 03.
APTIC-25664

THE MANUFACTURE OF PURE SULFUR DIOXIDE AND SULFUR FROM GASES CONTAINING SMALL AMOUNTS OF SULFUR.

(La fabrication de l'anhydrides sulfureux pur et du soufre par les gaz sulfureaux pauvres). Text in French. Ind. Chim. (Paris), vol. 25:795-802, Dec. 1938.
J. Demagny.
Identifiers: *So2 removal (combustion products), *By-product recovery, Europe, France, Combustion gases, Adsorption (general), Alkaline additives, Ethyl alcohol, Ammonium compounds, Cyanides, Naphthenes, Aromatic hydrocarbons, Xylenes, Organic sulfur compounds, Silicates, Sulfites, Reduction, Compression, Water.

The various processes by which sulfur dioxide gas is purified and by which it is converted into elemental sulfur, as these were known in the year 1938, are summarized. Procedures exploiting the chemical properties of SO2 include the fixation of the gas to a strong base in the form of a sulfite or bisulfite, which is then attacked by a strong acid to liberate the SO2 gas. Substances such as aniline and xylidine can also be used and reused in a continuous cycle. The use of various solvents has been known from quite early times, especially the use of water in addition to alcohols, especially ethyl alcohol. Various other solvents (aldehydes, aromatic hydrocarbons, sulfocyanides, and tetrahydronaphthalene) are discussed in connection with patented procedures and techniques. Absorbing materials include wool charcoal and silica gel. SO2 can also be purified by liquefaction of the gas by compression and cooling. The recovery of SO2 from combustion gases is regarded as unduly expensive, due to the complications involved. Even the recovery of SO2 from metallurgical fumes, where the concentration of SO2 is 1-4%, is regarded as an extremely delicate operation. The possibilities of using ammonia or other strong bases for such a recovery is discussed. Also summarized is the state of knowledge of various chemical reactions by which SO2 can be reduced to elemental sulfur, and the commercial applications based on these reactions.
APTIC-25670

STANDARD METHODS OF FILTER TESTING.

(Standardni metody pro zkouseni filtru). Text in Czech. Zdravot. Tech. Vzduchotech., 11 (1):13-22, 1968. 8 refs.
Jiri Tuma, and Bela Starkova.
Identifiers: *Measurement methods, *Filters, Czechoslovakia, Aerosols, Dusts, Chemical methods, Photometric methods, Radiation measuring systems, Aerosol generators, Radioactive tracers.

Methods of filter testing used in Czechoslovakia and several other countries are described and critically evaluated. The authors propose three standard methods for filter testing: (1) Dust feeding method was indirect gravimetric determination of dust concentration before and after the filter (suitable for 20-95% dedusting); (2) Liquid monodispersed aerosol method with direct optical determination of aerosol concentration before and after the filter (for 90-99.999% dedusting); and (3) Method of radioactively labeled natural aerosols with indirect aerosol concentration determination before and after the filter by measurement of the activity of samples on the filter (for 90-99.999% dedusting). Two new elements of testing apparatus are described: a dust feeder of the ejector type and a generator of monodispersed aerosols which consist of a flow-through furnace where the liquid aerosol condenses on its own nuclei. Dibutylphosphate and oil were tested as an aerosol forming liquid.
APTIC-25674

OIL-FIRED AND COAL-FIRED 600-MW BOILER OF THE POWER PLANT AT LE HAVRE.

(La Chauffe au mazut et au charbon de la chaudiere de 600 M w de la centrale du Havre). Text in French. Sciences Techniques, no. 12:3-12, Nov. 1968. 4 refs.
Guy Quesnel, and Pierre Theilmann.
Identifiers: *Steam plants, *Dispersion, *Sulfur dioxide, Corrosion, France, Coal, Residual oils, Stacks, Air-fuel ratio, Sulfur trioxide, Pressure, Temperature.

Described is a boiler producing 1810 tons per hour of superheated steam at a temperature of 567 C and a pressure of 167 bars. This boiler feeds 600 megawatt a turbo-alternator unit which forms the second stage of construction of the new Electricite de France thermal power plant at Le Havre. Heavy fuel oil and pulverized coal can be burned separately or jointly; the consumption at full power is 129 tons per hour of fuel oil, 217 tons per hour of pulverized coal, or any intermediate depending on the oil-coal ratio. To keep up this rate of consumption a fleet of 16 ore ships of 50,000 register tons each or a fleet of 5 oil tankers of 100,000 register tons each is required. Correspondingly, between 2000 and 3000 tons per day of combustion wastes which can not be recovered in the waste-recovery plants, must be buried in deep trenches off Le Havre. Description of the boiler structure and the combustion chamber with tangential fuel injection from four recessed burners is followed by a discussion of the problem of burning fuel oil which may contain up to 4% sulfur. The tangential fuel injection combined with a small excess of combustion air injected from several points provides an excellent solution of this problem as it results in a small rate of conversion of SO2 into SO3 mixture, with a consequent decrease in the rate of corrosion of the metal panels surrounding the combustion chamber. The excess combustion air and the highest chimney in Europe (240 m) combine to lower the pollutant content of the exhausts and to disperse those that remain away from adjacent residential areas. Equipment for preliminary treatment of fuel oil and coal is described. The operations of the boiler is almost fully automatic and is protected by a system of continually monitored protective devices.
APTIC-25677

EXHAUST EMISSIONS FROM SEVEN LP GAS POWERED VEHICLES.

Preprint, National Air Pollution Control Administration, Durham, N. C., Div. of Motor Vehicle Research and Development, 6p., July 1970.
H. Anthony Ashby.
Identifiers: *Automobiles, *Propanes, *Compressed gases, Engine exhausts, Engine operating cycles, Fuel gases, Gasolines, Internal combustion engines, Automotive emission control, Hydrocarbons, Carbon monoxide, Nitrogen oxides.

Test data are presented on seven automobiles powered by liquid propane gas (LPG); all were late model, standard-sized American cars equipped with V-8 engines, automatic transmissions, and duel fuel carburetion systems but without air conditioning. Testing followed the proposed 1972 Federal procedure which includes a cold start, the LA4-S3 driving schedule, and emission sampling by the CVS method. In addition, a hot-start two cycle test was made according to the 1970 Federal procedure, with the CVS method being employed as well as continuous sampling. Comparison of the data with those from similar tests on similar vehicles fueled by gasoline indicate the chief advantage of LPG-powered cars: good control of carbon monoxide, with an average CO reduction of 71% in this study. Average hydrocarbon reduction was 18.4% and, for nitrogen oxides, 28.6%. Driveability during tests was typical of lean operation, with slight hesitation on tip-in, stretchiness on acceleration, and surging during cruise.
APTIC-25678

FLY ASH AIDS IN SLUDGE DISPOSAL.

Environ. Sci. Technol., 1 (5): 374-379, May 1967. (Presented at the Purdue Industrial Waste Conference, 22nd Annual, May 2-4, 1967.)
Fred W. Moehle.
Identifiers: *Fly ash, *Solid waste disposal, *Filters, Sludge, Operating variables, Odor counteraction, Design criteria, Temperature.

Dewatering industrial waste plant sludge using fly ash as a filtering aid has proved successful. To fully understand where the sludge comes from, how it is collected, and how dewatering is accomplished, the entire waste treatment plant operation is first described. Fly ash is introduced approxi-

mately 10 inches downstream from the point at which the sludge enters the top of the sludge feed mixing conveyor. The optimum mixture should be in the range of four parts sludge to one part fly ash by weight. Dewatering starts when the mixture enters the filter, and the mixture continues to dewater, forming a cake on top of the drum. Because of a 15-20 inch mercury vacuum in the chambers beneath the cloth, the water is filtered out into the vacuum chamber. When a vacuum chamber rotates to the top of the drum, the vacuum is automatically shut off and compressed air at 3 psig is introduced to the chamber, dislodging the cake which then falls into a collecting chute. The dewatered sludge has no discernable odor. A sludge temperature of 65 C was most suitable. Some operating problems in using this method are mentioned.
APTIC-25694

LNG PIPELINES - A STATUS SURVEY.

roc. Nat. Gas Processors Assoc., vol. 47:66-70, 1968.
D. H. Norrie, and G. Walker.
Identifiers: *Natural gas, *Transportation, Canada, Pressure, Temperature.

Liquefied natural gas pipelines could be an economic alternative to compressed gas lines for natural gas transport, particularly for isolated areas and for special applications. Such lines would operate at pressures between 200 and 800 psi at temperatures between -120 F and -296 F. Pumping stations would be required at intervals of the order of 25-75 miles, while refrigerating stations could be spaced at intervals of 50-1000 miles depending on the throughput, the pipe diameter, and the insulation used. For short lines, plastic-foam insulation would be necessary. Although LNG pipelines are technically feasible, no valid conclusions can yet be drawn regarding their economics. (Author conclusions)
APTIC-25697

CATALYTIC REACTION OF CARBON MONOXIDE WITH STEAM.

(Badischen Anilin- und Soda-Fabrik A. G., Ludwigshafen (West Germany)) U. S. Pat. 3,529,935. 4p., Sept. 22, 1970. 14 refs. (Appl. April 10, 1968, 6 claims).
Ernst Lorenz, Friedrich Wodtcke, Franz Ludwig Ebenhoech, Erich Giesler, and Helmut Kirner.
Identifiers: *Catalysis, *Steam, *Carbon monoxide, Germany, Cobalt compounds, Molybdenum compounds, Nickel compounds, Carbon dioxide, Catalysts, Hydrogenation.

Catalysts based on iron are generally used for the catalytic conversion of carbon monoxide with steam to carbon dioxide and hydrogen. Oxidic or sulfidic catalysts containing transition elements of Group VI of the Periodic System and cobalt and/or nickel on a carrier of aluminum oxide and magnesium oxide have considerable advantage over iron-based catalysts. In specific, the catalysts have excellent hydrogenating properties and mechanical strength, are insensitive to sulfur, and undergo little or no change as regards their structure or internal surface area. The catalysts make the use of higher space velocities and subsequently smaller reactors possible. However, instead of a higher space velocity, it is also possible to use lower reaction temperatures if low-temperature conversion is indicated for reasons of equilibrium. Examples of advantageous combinations of catalytically active components of the catalysts are molybdenum and cobalt, molybdenum and nickel, tungsten and cobalt, and tungsten and nickel. Instructions are given for preparing the catalysts.
APTIC-25700

RESEARCH AND DEVELOPMENT OF STACK GAS DESULFURIZATION PROCESS.

Chem. Economy Eng. Rev., 2 (3):17-20. March 1970.
Akira Takahashi.
Identifiers: *By-product recovery, *So2 removal (combustion products), Japan, Stack gases, Electric power production, Adsorption (general), Manganese dioxide (japanese), Sulfuric acid, Ammonium compounds, Sulfates.

Due to increasing consumption of sulfur-containing fuel oil, pollution by sulfur dioxide has become a pressing problem in Japan. Various promising flue-gas desulfurization methods have been studied during the past few years: the limestone (or dolomite) process, activated carbon process, activated manganese oxide process, Kiyoura-TIT catalytic oxidation process, and water-washing processes. The activated carbon and activated manganese oxide are described in detail, together with progress in their research and development. The former yields sulfuric acid as a by-product and the latter ammonium sulfate of commercial quality. Both processes have been tested in pilot plants, and major technical problems solved. Each will be used on a commercial scale by one or more electric power companies.
APTIC-25702

ANTIPOLLUTION APPARATUS.

(Assignee not given.) U. S. Pat. 3,530,807. 7p., Sept. 29, 1970. 6 refs. (Appl. April 28, 1969, 9 claims).
Solomon Zalman.
Identifiers: *Smokes, *Incineration, *Scrubbers, Combustion gases, Oil burners, Design criteria, Steam.

An antipollution apparatus for removing the smoke particles from exhaust gases of an incinerator of fuel burning apparatus is described, having a plurality of spiral coils with steam jets mounted against the internal walls of the chimney adjacent to its opening and supplied with steam under pressure. As an incinerator, the apparatus also utilizes a gas burner for igniting the refuse articles, and an air blower having an air jet manifold for maintaining a high temperature of combustion within the incinerator. The apparatus also includes a control panel connected to a temperature dispensing device for operating the gas burner, and air blower to maintain a high temperature of combustion within its combustion chamber. Previously, smoke precipitation devices such as electrostatic fields and steam spraying apparatus have been used; however, electrically operated devices are costly to install, expensive to operate, and are often unreliable. (Author abstract modified)
APTIC-25706

PRODUCTION OF SOUR GAS-SULFUR WELLS EMPLOYING A SULFUR SOLVENT.

(Phillips Petroleum Co., Bartlesville, Okla.) U. S. Pat. 3,531,160. 3p., Sept. 29, 1970. 6 refs. (Appl. Sept. 18, 1968, 6 claims).
Henry B. Fisher.
Identifiers: *Solvents, *Natural gas, *By-product recovery, *Sulfur compounds, Hydrocarbons, Ketones, Organic sulfur compounds, Sulfides, Hydrogen sulfide.

Elemental sulfur is removed from a sour sulfur well by circulating into and from the wall a liquid alkyl sulfide and/or a liquid alkyl disulfide. This particularly applies to preventing sulfur deposit in riser pipes in the extraction of natural gases laden with hydrogen sulfide when elementary sulfur is present in the deposit. N-butyl sulfide, di-tert-butyl disulfide, and polysulfides are solvents useful in sour gas sulfur production to remove sulfur which otherwise may cause plugging problems. Sulfur dissolved in the polysulfides employed can be recovered by contacting the used solvent with a low boiling solvent such as ketone or hydrocarbon, e.g., acetone, pentane, or hexane. The recovered organic sulfur compound can be reused for recovery of further sulfur. Sulfur dissolved in n-butyl sulfide or di-tert-butyl disulfide is recovered by distillation or another process. (Author abstract modified)
APTIC-25708

MOBILE DUST AND DEBRIS COLLECTION AND INERTIAL DUST SEPARATOR FOR AIRPORT RUNWAYS AND/OR STREET CLEANING.

(Secretary of the Air Force) U. S. Pat. 3,540,073. 9p., Nov. 17, 1970. 2 refs. (Appl. Feb. 19, 1969, 7 claims).
Edward S. Issenmann, and Roger A. Miller.
Identifiers: *Dusts, *Inertial separation, Airports, Design criteria.

Existing runway surface cleaners and dust debris separators of the vacuum type usually employ porous cloth bags for dust control and have many disadvantages: the bags need periodic replacement; they cannot be used in damp or wet weather; and they are bulky, expensive, and easily damaged. The present device has spaced dust and air mixture discharge conduits which extend upward from the collection chamber and discharge tangentially into the opposite ends of each inertial dust separator and whirl introduced dust and smaller particle around the inside. The dust and heavier particles are thrown outward while a cleaner central column of air is discharged out through central openings in the opposite ends of each separator, induced by the relative low-pressure in the surrounding compartment.
APTIC-25709

ELECTROSTATIC CONDITIONING ARRANGEMENT.

(Constantin Graf von Berckheim, Weinheim an der Bergstrasse, Germany) U. S. Pat. 3,531,150. 4p., Sept. 29, 1970. 5 refs. (Appl. June 5, 1968, 14 claims).
Herbert Jahnke.
Identifiers: *Automobiles, *Air conditioning equipment, *Electrostatic precipitators, Germany, Odor counteraction, Design criteria, Voltage.

An arrangement is described for electrostatically conditioning the air in the passenger compartment of a motor vehicle. Such conditioning delays the development of fatigue and, at least to a certain extent, eliminates contaminants and odors from the air. The arrangement comprises an electrode mounting on the ceiling, insulation from the body of the vehicle, and a source of direct current supplying between 90 and 150 volts. Electrically conductive means are provided on at least one of the interior surfaces with which a passenger comes into contact.
APTIC-25711

HYDRODESULFURIZATION OF HEAVY PETROLEUM DISTILLATES.

(Esso Research and Engineering Co., Baton Rouge, La.) U. S. Pat. 3,531,398. 6p., Sept. 29, 1970. 7 refs. (Appl. May 3, 1968, 8 claims).
Clark E. Adams, and William T. House.
Identifiers: *Distillate oils, *Hydrodesulfurization, *Catalysts, Petroleum refining, Cobalt compounds, Molybdenum compounds, Nickel compounds, Aluminum oxides, Silicon compounds, Surface properties.

A method for the production of low-sulfur fuel oil is described, by means of a continuous liquid phase hydrodesulfurization process for petroleum gas oil feed having an end point in the range of 750 to 1300 F. Heavy petroleum distillates such as gas oils are hydrodesulfurized with a high activity maintenance catalyst consisting essentially of a cobalt salt or a nickel salt and a molybdenum salt or a tungsten salt deposited on a support material consisting essentially of 1 to 6 wt percent silica and 94 to 99 wt percent alumina, characterized by having a high surface area. (Author abstract modified)
APTIC-25713

CHEMICAL SUPPRESSION OF NITROGEN OXIDES.

(Grace (W. R.) and Co., New York) U. S. Pat. 3,528,797. 5p., Sept. 15, 1970. 2 refs. (Appl. Nov. 8, 1967, 6 claims).
Andrew B. Funk, and James C. Moore.

Identifiers: *Urea, *Scrubbers, *Nitrogen oxides, Stack gases, Fertilizer manufacturing, Absorption, Nitric acid, Organic nitrogen compounds, Phosphates, Oxidation, Reaction mechanisms.

A scrubbing apparatus containing urea is provided which substantially eliminates all nitrogen oxides that are formed as by-products of the phosphate fertilizer manufacturing process. Urea when dissolved in water reacts with nitrogen oxide and nitrogen dioxide gases to produce nitrogen, carbon dioxide, and water. The preferable range of urea is 0.1 to 0.3 weight percent, based on the total weight of the batch size, and it may be employed in an aqueous scrubbing tower or added to the acidulation mass.
APTIC-25714

EXHAUST GAS WASHING APPARATUS.

(Assignee not given.) U. S. Pat. 3,538,685. 5p.,
Nov. 10, 1970. 4 refs. (Appl. July 28, 1969, 10
claims).
Jack Bremen.
Identifiers: *Particulates, *Spray towers, *Automotive emission control, Engine exhausts, Internal combustion engines, Automobiles, Baffles, Design criteria.

An exhaust gas washing apparatus is described, which is designed primarily for use on automobiles to remove substantially all solid particles. It includes an inlet portion in which the exhaust gases are subjected to fine jets of a cleansing liquid. The exhaust gases and water mist or spray are swirled together by high speed rotary members. They then pass into the outlet portion of the apparatus which comprises baffles, defining a tortuous passage and against which water particles may impinge and collect for movement by gravity to a collection or discharge portion of the apparatus. The water jets are supplied with water under pressure from any suitable means, such as the water pump of the associated internal combustion engine, and the water collected in the sump of the exhaust gas washing apparatus may be returned either by gravity or suitable pump apparatus to the radiator of the associated engine.
APTIC-25715

SMOKE ABATEMENT DEVICE.

(Assignee not given.) U. S. Pat. 3,537,239. 3p.,
Nov. 3, 1970. 9 refs. (Appl. Nov. 12, 1968, 4
claims).
Paul C. Dunmire.
Identifiers: *Smokes, *Filter fabrics, *Design criteria.

An apparatus is described for removing pollutants from an air stream. The device has an upper portion of concentric chambers enclosed by an outer housing having a feed inlet, and an intermediate closed housing with a perforated lower half. An inner open ended conduit connects the two sections. Feed enters and passes through layers of oil, water, and lime which extend to a level above the perforations; the cleaned air is then drawn through the open ended conduit into the intermediate portion which contains a filter bed and is connected to an exhaust. A perforated water intake pipe is located in the outer passage for discharging a cooling liquid onto the upper part of the perforated closed housing. (Author abstract modified)
APTIC-25716

LIQUID MIST COLLECTION.

(Monsanto Enviro-Chem Systems, Inc., Chicago,
Ill.) U. S. Pat. 3,540,190. 7p., Nov. 17, 1970. 5 refs.
(Appl. May 16, 1963, 5 claims).
Joseph A. Brink Jr.
Identifiers: *Mists, *Glass fabrics, Gravity settling, Design criteria, Phosphoric acid, Sulfuric acid, Liquids.

A finely divided mist is separated and collected from a gas in which the mist is disposed by passing the gas through a bed of inorganic fibers (preferably glass fibers), composed almost entirely from fibers having diameters within the range of about 5 to 30 micron and compressed to a density of about 5-20 pounds per cubic foot. The mist is collected upon the surfaces of the fibers, then drained from the fiber bed by gravity flow in a continuous liquid phase. The apparatus is particularly useful with respect to the removal and recovery of acid mists, such as sulfuric or phosphoric acids.
APTIC-25717

ELECTROSTATIC FLOCKING APPARATUS.

(Assignee not given.) U. S. Pat. 3,530,828. 5p.,
Sept. 29, 1970. 7 refs. (Appl. July 5, 1968, 3
claims).
Samuel M. Schwartz.
Identifiers: *Electrostatic precipitators, *Design criteria, Maintenance, Electrical properties, Voltage.

With electrostatic flock printing apparatus, great advantages are to be achieved from utilizing a suitably apertured reciprocating upper electrode to which, together with a lower electrode, an alternating potential of high voltage is applied so that the flock element will be properly oriented when deposited upon with the material to be flocked. An apparatus is provided for vibrating the upper electrode to keep the flock from accumulating there. The flock may be in the form of finely chopped or otherwise divided fibers or particles of material including vegetable or animal matter, nylon, or other synthesis or nitrogenous fibers of natural or synthetic origin other than metallic substances.
APTIC-25718

STUDY ON THE REMOVAL EFFICIENCY OF SO2 GASES BY A WET-TYPE ELECTRIC PRECIPITATOR.

(SO2 gasu no shisshiki denkishujinki ni yoru
jokyokoritsu no kenkyu). Text in Japanese. Taiki
Osen Kenkyu (J. Japan Soc. Air Pollution), 4
(2):188-193, Nov. 1970. 14 refs.
Takayoshi Adachi.
Identifiers: *Electrostatic precipitators, *So2 removal (combustion products), Japan, Combustion gases, Corona, Voltage.

A wet-type cylindrical electric precipitator, with a liquid irrigated glass wall (positive electrode) and a wire at the center producing a corona discharge, was studied. The gas was obtained from the device specified in JIS-KO-103 (1963). The characteristics of the sulfur dioxide removal efficiency for the applied voltage were hardly different between the positive and negative corona discharges at a moderate applied voltage. The SO2 removal efficiency increased with increasing corona voltage, but was saturated at a high applied voltage. The removal rate was 95% at over 9 kV when the SO2 concentration was less than 0.6%. The removal efficiency increased in proportion to the reaction time of the gas. When the irrigated liquid was aqueous Na2CO3 (5%) of aqueous H2SO4 (10%) instead of water, the SO2 removal efficiency became nearly 100% and 34% at 7KV, respectively.
APTIC-25720

MAINTENANCE AND MANAGEMENT OF AUTOMATIC-TYPE AIR CLEANERS.

(Jidogata kukiseijosochi no ijikanri). Text in
Japanese. Kuki Seijo (Clean Air-J. Japan Air
Cleaning Assoc., Tokyo), 8 (5):30-33, Nov. 1970.
Shoichi Matsuzaki.
Identifiers: *Operating variables, *Control equipment, Japan, Dusts, Particle size, Collectors, Electrostatic precipitators, Filters, Maintenance.

Air cleaning devices can be divided into several types based on the fundamental operational principles: filtration, electrostatic, and collision-adhesion types. The maintenance and management of the three types of air cleaners are described in detail. A table is attached that lists different types of cleaners under the three categories. Under the electrostatic types are the self-cleaning, periodical cleaning, media exchangeable, and automatic winding types. For each type of cleaner, representative trade mark names, basic mechanicms, applicable particle size, dust concentration, collection efficiency (%), resistance (m/m Aq), and the types of application are listed.
APTIC-25723

THE MAINTENANCE AND PRESERVATION OF THE EFFICIENCY OF AN ELECTRIC AIR-CLEANING DEVICE.

(Denkishiki kuki seijosochi no seino no ijikanri to
hoshu ni tsuite). Text in Japanese. Kuki Seijo
(Clean Air-J. Japan Air Cleaning Assoc., Tokyo), 8
(5):18-29, Nov. 1970. 2 refs.
Etsuya Kameko.
Identifiers: *Operating variables, *Electrostatic precipitators, *Maintenance, Legislation, Japan, Bacteria, Dusts, Particle size, Air conditioning equipment, Inspection, Humidity, Temperature (atmospheric).

General operational and maintenance procedures of electric air purification device are presented. In line with increasing air pollution, more contemporary air conditioners come equipped with air filter systems in addition to temperature and humidity conditioning functions. Since the enforcement of the new environmental hygiene law effective April 1970, it has become mandatory to regulate temperature, humidity, dust, bacteria, and harmful gas in air in a building having a total floor space of 8000 sq m, or housing 1000 or more occupants, to comply with the standards set forth therein. Fine-grain dust of 5 micron or smaller in size usually accounts for 80-85% of the total dust drifting in atmospheric air. This fine-grain dust which a mechanical filter fails to capture is what has to be filtered. Only the electrical filter system can do the job. However, where optical density of dust is too high or fibrous dust is too dense, an electrical air filter should be used only in combination with a mechanical filter or with a front-stage dust eliminator that is easy to clean and maintain. Where corrosive or explosive gas is contained in air, an electric air purifier is not recommended. Operational remarks for an electrical air purifier are rated wind volume for filtering which should not be exceeded if the highest efficiency is to be maintained; wind speed distribution of air current passing through the dust collector unit which should be uniform; no drastic adjustment of wind volume during operation should be made; and no excessive accumulation of the arrested dust in the dust collector unit is allowed. As to maintenance, prompt and timely disposal of the arrested dust and regular inspection, both mechanical and electrical, of component units and parts are important. Monthly and yearly inspections with implementation procedures thereof are given in detail. They included cleaning of the dust collector unit, duct interiors and pre- and after-filters as well as inspection of electrical wiring and connections. A few repair instructions are also given.
APTIC-25724

AFTERBURNER FOR AN INTERNAL COMBUSTION ENGINE.

(Naineakikan no afuta bana). Text in Japanese.
(Daihatsu Industries (Japan), Ikeda Works) Japan.
Pat. Sho 45-20046. 3p., July 8, 1970. (Appl. Oct. 28,
1966, claims not given).
Takashi Kobayakawa.
Identifiers: *Internal combustion engines, *Afterburners, Japan, Engine exhausts, Automobiles, Automotive emission control, Combustion air, Design criteria, Heat transfer.

Exhaust gas of an internal combustion engine, taken into an afterburner device, is automatically supplied with supplementary air and led by rotary type honey-comb heat exchangers into the combustion chamber. The honey-comb heat exchanger is divided into two sections so that one section is radiating heat when the other section is absorbing

or receiving heat. In the combustion chamber, an ignition plug is located closer to the intake port of the afterburner than to the outlet port. The exhaust gas is thus heated as it goes through the heat exchanger, and then ignited to completely burn in the combustion chamber. The gas then goes through the other section of the heat exchanger, thereupon heating that section, and is finally discharged out of the device. Since the honeycomb heat exchanger rotates at low speed (about 30 rpm) it receives at one side the heat produced by burning of the exhaust gas in the combustion chamber while releasing at the other side the received heat to heat up the exhaust gas coming into the combustion chamber for complete combustion. At the center of the heat exchanger is a drive shaft connected, for example, to the engine by means of a cable. The heat exchanger may be driven for this rotary movement by energy of the gas burnt therein if provided with a blade or two, in which case the above mentioned power cable is not necessary. The honey-comb is made of ceramic or similar material that gives excellent heat-exchange characteristics. The intake pipe of the afterburner is directly connected to the manifold while the discharge pipe is connected to the exhaust pipe of the engine. An air injection nozzle provided near the intake port of the device automatically lets out air when pressure is lowered by the exhaust gas flowing fast by it. The amount of air intake should be around 10% of the exhaust gas taken in.
APTIC-25728

ELECTROSTATIC FILTER FOR THE PURIFICATION OF GASES AND PARTICULARLY OF THE AIR.

(Assignee not given.) U. S. Pat. 3,537,238. 4p., Nov. 3, 1970. 4 refs. (Appl. Nov. 14, 1968, 7 claims).
Julien Dungler.
Identifiers: *Electrostatic precipitators, *Design criteria, Europe, Maintenance, Electrical properties.

An electrostatic precipitator is described which has three electrodes of one electrical potential alternating with three of opposite potential. Each electrode has openings for passage of the gas, providing a single pathway through the filter and arranged in a staggered position in the direction of the gas flow so that the gas stream passing through one opening bounces against the next electrode. A ribbon of gas-permeable, insulating, or non-conductive material is arranged in zigzag line between the electrodes, subdividing the spaces and longitudinally movable from filter outlet to inlet. The alternating potentials produce a field strength of at least 3000 v/cm between the electrodes; a voltage of about 10,000 v at a distance of one centimeter between the electrodes is especially favorable for good filtering. The apparatus overcomes the disadvantages of current filters which are inefficient and which must be periodically removed from operation for cleaning.
APTIC-25733

SELECTIVE METHANATION OF CARBON MONOXIDE.

Ind. Eng. Chem. Prod. Res. Develop., 9 (4):512-515, 1970. 5 refs.
Amirali Rehmat, and Sarabjit S. Randhava.
Identifiers: *Methanation, *Carbon monoxide, *Catalysts, Feasibility studies, Fuel gases, Hydrogen, Carbon dioxide, Chemical reactions, Temperature.

The selective methanation of carbon monoxide in a gas mixture containing hydrogen, carbon dioxide, and carbon monoxide (about 3000 ppm) was investigated within a temperature range of 125 to 300 C using several catalysts in order to determine the economic feasibility of the process for removing or decreasing the CO levels which occur as impurities in economical grades of hydrogen for commercial use. The object of the experiments was to decrease the concentration of carbon monoxide to about 50 to 100 ppm without considerably affecting the concentration of other components. The catalysts were compared by measuring their CO conversion rates. Test variables were temperature and space velocity; the entire series was conducted at atmospheric pressure. For all the catalysts studied, the CO concentration in the effluent decreased continuously until a temperature between 200 and 250 C was reached; beyond this point, analysis showed a continuous increase in the outlet CO concentrations. Ruthenium was the most effective carbon monoxide methanation catalyst, followed closely by the Raney nickel-type catalyst. Catalysts prepared by precipitating nickel on the supports were unsatisfactory.
APTIC-25736

DEVICE FOR REDUCING THE CONTENT OF CARBON MONOXIDE IN THE EXHAUST GASES FROM AN INTERNAL COMBUSTION ENGINE.

(Hivag Handels- und Industrie-Verwaltungs A. G., Vaduz (Liechtenstein)) U. S. Pat. 3,537,829. 4p., Nov. 3, 1970. 11 refs. (Appl. May 15, 1967, 12 claims).
Walter Ott.
Identifiers: *Centrifugal separators, *Automotive emission control, *Carbon monoxide, Europe, Engine exhausts, Internal combustion engines, Air-fuel ratio, Design criteria, Combustion.

A device placed between the fuel-air mixture supply apparatus and the intake of an internal combustion engine is described which reduces carbon monoxide in the exhaust gas by causing more complete fuel combustion. The device includes a cyclone chamber divided into two subchambers by a mesh screen extending across it. The first subchamber connects with the mixture intake; the second, with the mixture outlet. The intake is positioned at an acute angle relative to the screen surface and tangential to the chamber to promote a swirling motion in the fuel-air mixture. The mesh of the gauze should be 1 mm at most, and preferably less than 0.5 mm. The fine-meshed gauze produces a finer subdivision of the fuel droplets before their entry to the engine, resulting in more intimate mixing with the oxygen-containing air to produce more complete fuel burning.
APTIC-25737

REMOVAL OF SO2 GAS.

(Aryusan gasu kaisho hoho). Text in Japanese.
(Koga Mine Industrial Co. (Japan)) Japan. Pat. 172,814. 6p., May 31, 1946. (Appl. Oct. 28, 1940, claims not given).
T. Nakazono.
Identifiers: *Absorption (general), *Formic acid, *Esters, Japan, Combustion gases, Sulfuric acid, Calcium compounds, Sodium compounds, Temperature.

Sodium formate and/or calcium formate were used as the absorbents for the removal of sulfur dioxide gas of low concentration under low temperature. The amount of SO2 gas absorbed was remarkably increased with an increase in the amount of absorbents. With an increased amount of SO2 gas, using the same concentration of formate, the amount of SO2 absorbed increased until SO2 concentration reached 4%; it increased the least amount thereafter. The SO2 gas obtained by heating (55 to 100 degree) the formate solution which had absorbed SO2 gas was utilized for producing sulfuric acid in industry. The formic acid, produced by the sulfuric acid which was an intermediate product during this procedure was neutralized with alkaline salt (s) to regenerate the sodium or calcium formate. This method is economical and can be utilized for the long-term removal of SO2 gas.
APTIC-25742

PURIFICATION OF INDUSTRIAL EXHAUST GASES.

(Oczyszczanie odlotowych gazow przemyslowych). Text in Polish. Rudy Metale Niezelazne, 12 (10):532-537, 1967. 8 refs.
Jan Malachowski.
Identifiers: *By-product recovery, *Absorption (general), Europe, Stack gases, Steam plants, Primary metallurgical processing, Packed towers, Catalytic oxidation, So2 removal (combustion products), Phosphoric acid, Sulfuric acid, Ammonium compounds, Ammonia, Aluminum compounds, Sulfates, Sulfites, Temperature.

Several methods for sulfur dioxide removal from exhaust gases of power plants and chemicals and their utilization are discussed. In Czechoslovak power plants, the method used is basically circulation of absorbent (ammonium sulfite), which is saturated by SO2 at 20-35 C and releases SO2 into gas phase at 80-120 C. A new type of absorber with a packed bed consisting of aluminum spirals has been tested, which is cheaper and enables longer contact time. The optimum conditions of the process are discussed. The method used in the USSR is suitable for neutralization of gases with low SO2 content in the metallurgy of nonferrous metals. Sulfur dioxide is neutralized by ammonia and the ammonium sulfite obtained is treated by phosphoric acid. As a by-product, phosphoric fertilizer is obtained. The method has been tested and the parameters of the process analyzed. The method used in Rumania is basically the same, only the SO2 recovered is further used in sulfuric acid production. The parameters of the absorption process differ significantly from the Russian method. In Japan, SO2 from effluent gases is oxidized on vanadium contact. Gaseous ammonia is then introduced at 220-260 C to give ammonium sulfite. Alternatively, the gas after contact is cooled to about 95 C, which results in formation of 70% H2SO4.
APTIC-25743

THE DERIVATION OF GALLIUM AND ALUMINUM FROM COAL AND GAS DUSTS AND ASHES.

(Proby wydzielania glinu i galu z pylow i popiolow weglowych i gazowniczych). Text in Polish.
Poznan. Towarz. Przyjaciol Nauk, Wydzial Mat. Przyrod. Prace Komisji Mat. Przyrod., 12 (3):3-11, 1968. 6 refs.
Maksymilian Kranz, Marian Grala, and Marek Krzymien.
Identifiers: *Combustion products, *By-product recovery, *Metal compounds, Europe, Ashes, Dusts, Boilers, Coal, Fuel gases, Steam plants, Stacks, Cyanides, Ethers, Aluminum compounds, Chromium compounds, Iron compounds, Magnesium compounds, Molybdenum compounds, Nickel compounds, Vanadium compounds, Aluminum oxides, Iron oxides.

Methods of obtaining aluminum and gallium concentrates and eventually their complete isolation from coal and gas dusts of two Polish electric and gas works are reported. The amounts of Al and Iron in the dusts formed in the process of coal combustion in generators, boilers, and in dusts remaining in chimneys were determined to be 2-12% Fe2O3 and 1-9% Al2O3. Four different methods used to obtain Ga enriched material are described. Spectral analysis showed that only the methods of precipitation of gallium ferrocyanide and extraction by ethyl ether were successful. Spectral analysis also identified Fe, Al, and Mg as the main admixtures accompanying Ga. For Al separation, the methods of acidic and alkalic extraction were considered. The amount of Al in the dusts is up to 8% Al2O3. The generator dust is richer in Ga; the boiler dust, in useful metals like Cr, V, Ni, and Mo. These appear mostly in trace quantities. The method of their isolation has to be further developed.
APTIC-25744

THE LIQUEFIED NATURAL GAS PLANT OF THE 'WISCONSIN NATURAL' COMPANY AND ITS SPECIAL CHARACTERISTICS.

(L'installation de gaz naturel liquefie de la Societe 'Wisconsin Natural' et ses characteristiques propres). Text in French. Rev. Gen. Gaz., vol. 88:85-88, May-June 1966. Also: Am. Gas J., Dec. 1965.
Dean Hale.
Identifiers: *Natural gas, *Compressed gases, Construction materials, Aluminum, Steel, Analytical methods, Measurement methods, Filters, Carbon dioxide, Compression.

The liquefied natural gas plant of the Wisconsin Natural Gas Company in Oak Creek, Wis., distributor of consumer gas, is described. The storage tank consists of a flat-bottomed inner tank, 22 m in dia, 31 m high, made of welded aluminum alloy 5083 sheets whose thickness decreases with height and an outer tank made of carbon steel, ASTMA 283, grade C, 25 in. in dia 32 in. high. The space between the walls of these two tanks is filled with a heat insulating material, perlite, as well as with nitrogen kept at 1 atm over pressure. All welds were made in accordance with the ASMF Code and examined by X-rays. The two-walled tank rests on a circular base of reinforced concrete. The process of liquefaction of the natural gas is described. Natural gas from three different sources of different compositions is mixed to obtain a standard composition with the aid of a computer. The process of liquefaction is carried out in cascade and permits the elimination of variable amounts of the heavier constituents, such as ethane and propane. Two molecular filters are used alternately to retain carbon dioxide as well as water, one being regenerated while the other is in service. The system of distribution of the standard gas is described. Controls and special measuring equipment used include a recording calorimeter, an infrared spectrograph for measuring the CO2 content, and a gas chromatograph for determination of the composition of any flowing gas or liquid. It is particularly important to control the flow of the supply gas and the composition of the extracted gases. The H20 content of the supply gas after passage through the molecular filter is checked by a recording hygrometer.
APTIC-25745

FIRST NATURAL GAS LIQUEFACTION PLANT.

Text in French. World Petrol. Congr., Proc., 7th, Mexico City, 1967, p. 275-283.
J. Trollux.
Identifiers: *Natural gas, *Design criteria, *Compression, Costs, Africa, Operating variables, Ships, Compressed gases.

The natural gas liquefaction plant constructed at Arzew, Algeria, began operation in October 1964 and is an important link in the first project for transporting liquefied gas on an industrial scale. The liquefied gas is stored at a temperature of -160 C. The designed capacity of the plant is 7000 cubic meters of liquefied gas per day, enabling the exportation from Algeria of 1.5 billion cubic meters of gas per year. The gas is piped from its source to the plant across 500 km of desert, and after liquefaction is shipped by water to Paris and London. Figures are given on the cost of construction and operation, experience gained from a year of actual service, power problems, use of storage, and the possibility of constructing more plants of the same type.
APTIC-25748

CONVERSION OF URBAN REFUSE TO OIL.

Bureau of Mines, Washington, D. C., Solid Waste Program, TPR-25, 5p., May 1970. 1 ref. NTIS: PB 192414
Herbert R. Appell, Irving Wender, and Ronald D. Miller.
Identifiers: *Fuel oils, *Solid waste disposal, *By-product recovery, Autoclaves, Carbon monoxide, Oxygen, Sulfur compounds, Steam, Pressure, Temperature, Sludge, Furnaces.

Urban refuse, cellulosic wastes, and sewage sludge were converted to heavy oil by heating under pressure with carbon monoxide and steam. The experimental work was conducted in a 500-ml autoclave heated in a furnace fitted with a rocking mechanism. Conversion of the organic matter to oil, water, and gas averaged near 90% at 350-400 C and 1500-5000 psi. The yield of oil, based on the dry organic matter of the waste materials, is usually near 40%. This is the equivalent or more than two barrels of oil per ton of dry, ash-free material. The oil from urban refuse and cellulosic wastes has a sulfur content near 0.1%. This low sulfur content makes the oil from refuse a desirable source of fuel oil.
APTIC-25753

A SUGGESTED PROGRAM FOR GOVERNMENT AND INDUSTRY IN SOLVING THE AUTOMOTIVE EMISSIONS PROBLEM.

Preprint, Society of Automotive Engineers, Inc., New York, 4p., 1968. (Presented at the Automotive Engineering Congress, Detroit, Mich., Jan. 8-12, 1968, Paper 680179.)
Richard S. Morse.
Identifiers: *Automotive emission control, Abatement, Federal governments, Engine exhausts, Electric propulsion, Steam engines, Automobiles.

In an effort to implement recommendations for the control of automotive air pollution, the more important findings of a government study group are summarized. On the basis of current technology, it will be feasible to reduce exhaust emissions considerably. The current technology does not, however, permit the development of an economical all electric car except for limited range use. External combustion type engines are technically feasible, but prospects of their introduction into the market are not a promising solution for pollution in the near future. No currently proposed new propulsion system, including those of advanced design, would be restricted because of supply of materials or energy sources. The responsibilities of both government and industry in the field of controlling pollution are considered. The development of effective means to infuse new ideas into the automotive industry is discussed.
APTIC-25757

CHARACTERISTICS AND APPLICATION OF HIGH PERFORMANCE DRY FILTERS.

ASHRAE (Am. Soc. Heating, Refrig. AirCond. Engrs.), 6(5):72-75, May 1964. 3 refs. (Presented at the Application Air Cleaning Symposium, ASHRAE Semiannual Meeting, New Orleans, La., Jan. 27-29, 1964.)
P. M. Engle Jr., and C. J. Bauder.
Identifiers: *Operating variables, *Filters, *Design criteria, Dusts, Particle size, Flow rates, Pressure.

The technical and practical aspects of high performance dry filters are presented. This type of filter has its media pleated, so that the area of media is several times that of the frontal area of the filter. The air velocity through the media is reduced, allowing the use of high efficiency media without generating excessive pressure drop. The life of this type of filter is quite long, because the amount of material collected per sq ft of media per unit time is greatly reduced. Efficiency in terms of particle size for this type filter is characterized by high efficiency for large and medium particles, a minimum efficiency in the submicron range, and increasing efficiency for even smaller particles. Methods of collection include impingement, interception, strainer action, and diffusional effects. The construction design and desired pressure drop are important aspects of the filter. The dust holding capacity of a filter depends upon the type of media being employed. Factors which favor high dust capacity are thick media, increasing density or decreasing particle size toward the downstream side, and rough media surface. Operating life at different conditions is dependent upon resistance and the rate at which dust is collected per sq ft of media. If space and economics permit, the optimum arrangement is to install twice the number the number of filters and operate them at 50% capacity.
APTIC-25766

ABSORPTION OF SULFUR DIOXIDE IN A VENTURI TUBE.

(Absorpce kyslicniku siricitebo ve Venturiho trubici). Text in Czech. Chem. Prumysl (Prague), 7 (32):340-343, 1957. 6 refs.
Jaroslav Skrivanek, and Vladimir Cada.
Identifiers: *Venturi scrubbers, *Absorption (general), *Flow rates, Czechoslovakia, Combustion gases, Mathematical modeling, Sulfuric acid, Carbonates, Gases, Pressure.

Gas containing 0.2% SO2 emanating from the manufacture of H2SO4 was absorbed in a venturi tube by a soda ash solution dispersed by the gas stream in the constricted neck of the tube. The degree of absorption and loss of pressure were studied with the view of testing the industrial feasibility of this method of recovery of sulfur. The venturi tube can be used only where the pipeline gas pressure exceeds 50 cm H2O and for comparatively low concentrations of gas to be absorbed. The theoretical relationship between gas absorption, gas flow volume and velocity was analyzed, an equation for the dependence of the absorption constant on gas flow volume, on liquid flow volume and on the intitial soda ash concentration derived. The experimental arrangement and the method of determining the residual concentration of SO2 in the gas following absorption is described. The absorption constant increases with increasing gas flow velocity and decreases with increasing absorption liquid volume. The absorption constant rise with rising gas flow velocity is greater than linear. The effectiveness of the venturi tube increases with increasing gas flow velocity, even though the contact between the phases is shortened, because of the positive effect of flow velocity on the absorption constant.
APTIC-25768

THE AIR OF ANCHORAGE--TODAY AND TOMORROW.

For primary bibliographic entry see Field 04.
APTIC-25770

NEGINEERING RESEARCH AND DEVELOPMENT IN AIR-POLLUTION CONTROL.

In: Problems and Control of Air Pollution. F. S. Mallette (ed.), New York, Reinhold, 1955, Chapt. 5, p. 42-49. 2 refs.
Leslie Silverman.
Identifiers: *Research programs, *Control methods, Commercial firms, Costs, Education, Engineers, Trade associations, Stack gases, Particulates, Open hearth furnaces, Stacks, Filter fabrics.

Ten specific research areas of air- and gas-cleaning technology which require further study are cited. Economic considerations emphasize the need for less costly air-cleaning devices, since control cost amortization by byproduct recovery is not always feasible and economic and community factors are causing limits on the use of tall stack dispersion. Improved education is required at the individual, public, and engineering levels. Considerable knowledge gained by a large research effort is not being used because it is not in the hands of imaginative engineers who can fully and appropriately apply it to practice. The value of pooling effort and supporting research and development on an industry-wide rather than an individual company basis is noted. A research program in progress to develop an economic solution to open hearth furnace emissions is described in which slag-wool fibers are used for an inexpensive, effective, refractory filter; this example is cited to show that knowledge and consideration of possible materials, filtration theory, and practice can assist in developing new methods of handling high-temperature gas-cleaning problems.
APTIC-25773

THE DYNAMIC DILUTION OF AEROSOLS BY MIXING WITH CLEAN AIR.

Ann. N. Y. Acad. Sci., 105 (2):88-133, March 20, 1963.
H. G. Norseth, and R. I. Mitchell.
Identifiers: *Aerosols, *Diffusion, Particle size, Baffles, Design criteria, Flow rates.

A general study of the dilution of aerosols flowing through a duct is presented, and design information for the construction of apparatus to achieve dynamic dilution is obtained. Aerosols comprised largely of dibutyl phthlate droplets containing a fluorescent tracer were mixed with clean air in several ratios of dilution while in transit through a 9-in.-sq duct. Samples of the diluted aerosol were taken from the duct to determine the extent of mixing of the concentrated aerosols with clean air, and to study wall loss and agglomeration of the aerosols during mixing. The aerosols were sampled with both a cascade impactor and all-glass impingers. Aerosols may be diluted with widely varying amounts of air while being moved through a 9-in.-sq duct at velocities of 8.8, 88, 440, and 880 ft/min. The large dynamic-dilution apparatus and the miniature diluter, when operated together, can achieve dilution of aerosols in ratios as high as 20,000:1. Dilution of aerosols with clean air can be accomplished during relatively short distances of travel down a 9-in. duct. Uniform mixing is attained within a distance of 56 in. from the aerosol inlet without a baffle. Substantially complete mixing may be accomplished within a distance of 20 in. from the aerosol inlet, at duct velocities of 440 and 880 ft/min, if a suitable baffle is placed in the aerosol stream. Aerosols can be diluted in the 9-in.-sq duct with little agglomeration. During dilution, wall loss, with or without agglomeration, is extensive for aerosol particles that are 16 micron in diameter and larger. Aerosol particles 12 micron in diameter and smaller are subject to little selective wall loss or agglomeration during dilution. Of the aerosol particles 12 micron in diameter and smaller that were generated in the aerosol chamber by the spinning disk, nearly all were successfully transported beyond the mixing stage of the dilution apparatus. Most of the loss of aerosol particles that were larger than 12 micron in diameter occurred in the chamber, on the walls of the venturi, and on the aerosol-inlet and -outlet tubes. (Author summary modified)
APTIC-25778

MODERN AUTOMATIC BAGHOUSES FOR COLLECTION OF LEAD-FURNACE FUMES.

Trans. AIME (Am. Inst. Mining Metallurgical and Petroleum Engrs.), vol. 121:299-303, 1936.
R. L. Hallows, and B. M. O'Harra.
Identifiers: *Fumes, *Primary metallurgical processing, *Bag filters, Costs, Lead, Furnaces, Maintenance.

A comparison is drawn between automatic and old style baghouses for filtering fumes, based on operating experience with both types in a lead smelter. The modern type is characterized by its small filtering bags and frequency of shaking (usually every few minutes), as opposed to the old type which uses much larger bags shaken at much longer intervals (2-12 hrs apart). Good practice for the modern baghouse calls for only 1 sq ft of filter cloth to handle from 3-8 cu ft of gas per minute; thus, the filtering area may be as little as one-tenth that in the old type for handling the same volume and dust concentration. This is the most striking difference and probably the greatest single advantage of the new type; others include greater cleanliness and uniform draft conditions due to the frequency of cleaning, more convenient repair of leaks, and lessened danger of fire. Although initial bag equipment costs for the new type are lower, the longer life of a bag in the old baghouse is much longer, so the cost of bag replacement is considerably in favor of the old type. Little trouble or expense is experienced in maintaining the new filters. Operating details are given.
APTIC-25781

AIR POLLUTION FROM IRONFOUNDRY CUPOLAS.

For primary bibliographic entry see Field 01.
APTIC-25783

FEASIBILITY OF FABRIC FILTER AS GAS-SOLID CONTACTOR TO CONTROL GASEOUS POLLUTANTS. (FINAL REPORT).

Owens-Corning Fiberglas Corp., Granville, Ohio, NAPCA Contract PH-22-68-64, 110p., Aug. 1970. 1 ref. NTIS: PB 195884
F. Munro Veazie, and William H. Kielmeyer.
Identifiers: *Bag filters, *Glass fabrics, *So2 removal (combustion products), Stack gases, Fly ash, Alkaline additives, Alkalized alumina (adsorption), Manganese dioxide (japanese), Flow rates, Temperature.

A program to evaluate the chemical contacting potential of fabric filters with emphasis on the 600-1000 F temperature range of a newly designed glass fabric is described. The gas tested, sulfur dioxide, was carried in flue gases that closely resembled in composition the effluent of coal burning facilities. The reactants chosen for consideration consisted of materials which had demonstrated ability to remove SO2 in other investigations. Two methods were used to introduce the reactant to the SO2: continuous injection into the flue stream before the bag chamber; and deposition on the bag surfaces in advance of the stream. Slaked limes and slaked dolomitic limes are particularly attractive for removing SO2 at high temperatures. However, their low efficiency of removal may require, for economic reasons, the regeneration of the reaction products. Because of its high cost, the utility of manganese dioxide as a reactant in commercial applications depends strongly on its ability to be regenerated. Its ability to remove SO2 is not affected by either flue gas flow rate or temperature. Alkalized alumina ranks as a very promising absorbent. It functions well at low temperatures, has high removal efficiency, and becomes more respondent at higher flow rates. Nahcolite functions well in all cases; however, not enough is known about its cost and regeneration ability to accurately evaluate it. The differences in performance under precoating conditions and under continuous addition conditions were evaluated. Several of the reactants performed better when fly ash was present, which means the bag houses could be used for both gaseous and particulate removal.
APTIC-25785

EFFICIENCY OF ELECTROSTATIC PRECIPITATORS AS AFFECTED BY THE PROPERTIES AND COMBUSTION OF COAL.

J. Inst. Fuel (London), vol. 36: 184-197, May 1963. 4 refs.
H. G. Trevor Busby, and K. Darby.
Identifiers: *Coal characteristics, *Pulverized fuels, *Electrostatic precipitators, Great britain, Stack gases, Fly ash, Boilers, Particulate classifiers, Absorption, Sulfur trioxide, Combustion, Electrical resistance.

The results of an investigation into the adverse performance of electrostatic precipitators on pulverized-fuel boilers firing certain coals from England and Australia are discussed. The effect of the electrical resistivity of the fly-ash is examined; when the resistivity of the dust exceeds about 10 to the 13th power ohm/cm, the efficiency of precipitation is reduced. The resistivity of the dust is determined by the surface condition of the dust particles. The adverse effect when resistivity is high can be overcome by the injection of sulfur trioxide into the flue before the precipitator: this is completely absorbed by the dust. The formation of sulfur trioxide from combustion of the sulfur in the coal is an over-riding factor in determining precipitator efficiency and this, while broadly related to sulfur content of coal, is also affected by unknown factors in the combustion process. (Author abstract modified)
APTIC-25786

METHOD FOR MANUFACTURING SULFUR.

(Satt att framstalla svavel). Text in Swedish.
(Assignee not given.) Swed. Pat. 80,439. 2p., May 23, 1934. (Appl. Nov. 1, 1932, 2 claims).
A. R. Lindblad.
Identifiers: *By-product recovery, *So2 removal (combustion products), *Catalysts, *Reduction, Sweden, Combustion gases, Coal, Alkaline additives, Sodium compounds, Sodium carbonate, Sulfur compounds, Sulfates, Sulfides.

A method is presented for use with gases containing sulfur dioxide derived from roasting or other processing of pyrites or other sulfur-containing ores, using coal or some other solid containing carbon as the reducing agent. This agent is mixed or impregnated with an alkali metal or alkali compound, such as sodium carbonate, sodium sulfate, or sodium sulfide. The alkali material acts as a catalyst, extremely effective against the formation of undesirable secondary products such as hydrogen sulfide, and its action extends beyond the time and place of contact between the gases and the solid reducing agent.
APTIC-25787

CATALYTIC HYDROGENATION OF SULFUR DIOXIDE.

(Hydrogenation catalytique de l'anhydride sulfureux). Text in French. Comp. Rend., vol.176:35-36, 1923. 2 refs.
Margaret G. Tomkinson.
Identifiers: *So2 removal (combustion products), *Catalysts, *Hydrogenation, France, Combustion gases, Fumes, By-product recovery, Cadmium compounds, Cobalt compounds, Copper compounds, Iron compounds, Nickel compounds, Sulfides, Temperature.

Finely divided nickel was used as an experimental catalyst in a reaction between dry hydrogen and dry sulfur dioxide, which normally do not react. Above 280 deg a small amount of water vapor appeared; above 350 deg, there was a simultaneous occurrence of hydrogen sulfide; and between 400 and 450 deg, there was a simultaneous occurrence of water, hydrogen sulfide, and elemental sulfur. Although the catalyst could be used indefinitely without a replacement, all of the metallic nickel was converted to nickel sulfide. Nickel sulfide is itself a catalyst for this specific reaction; it can be replaced by cobalt sulfide or (with less efficiency) ferrous sulfide. The sulfides of copper and cadmium do not have this effect. In its industrial application to the recovery of byproducts from fumes containing sulfur dioxide, the only limitation in the lifetime of such a catalyst would be the formation of a carbon layer on its surface, which would take about one month to become significant.
APTIC-25789

CARBON DISULFIDE–HYDROGEN SULFIDE BALANCE IN THE PRODUCTION OF VISCOSE TEXTILE FIBERS.

(Balans serougleroda i serovodoroda v proizvodstve viskoznoy tekstil'noy niti). Text in Russian. Khim. Volokna, no.6:65-66, 1968.
A. N. Selin, and P. I. Nivin.
Identifiers: *Textile manufacturing, *By-product recovery, *Carbon disulfide, *Hydrogen sulfide, Ussr.

Carbon disulfide/hydrogen sulfide balance in the production of viscose fiber was studied under industrial conditions at the Kalinin Combine. Process losses total 295 kg CS2 and 82 kg H2S per ton of alpha-cellulose. Degassing the solution in the settling tank is 16 g CS2, and 20 g H2S per cu m results in 14% recovery of CS2. Ventilation gases in the finishing section contain 0.3-0.4 g CS2/cu m, and 11-12% CS2 recovery is achieved. Overall, CS2 recovery of 45% is possible, with 7% in the form of elemental sulfur.
APTIC-25791

ACTIVITIES RELATED TO THE NON-MINING INDUSTRIES.

(Activites relatives aux industries autres que les mines). Text in French. Ann. Mines Belg., vol. 6:631-670, June 1969.
Personal Author Not Recorded.
Identifiers: *Bricks, *Mineral processing, *So2 removal (combustion products), Control programs, Control agencies, Research institutes, France, Industrial areas, Stack gases, Smokes, Kilns, Dust fall, Measurement methods, Precipitation.

The use of dolomite in the brickmaking industry to neutralize the sulfur dioxide in emissions (experimental data), measurement of smoke and SO2 pollution (description of methods, apparatus, measuring points), measurement of pollution fallout (dust fall, precipitation, meteorological influences, with special attention to the communities of Charleroi and Vilvorde), and an analysis of pollution control in France (public and private organizations, legislation, research institutes, including the Paris Municipal Hygiene Laboratory, the Paris Police Laboratory, the Laboratory of Automobile and Motorcycle Technology, and the National Institute of Applied Chemical Research are presented. The activities reviewed are part of the 1968 INIEX annual report.
APTIC-25794

METHOD FOR MANUFACTURING SULFUR BY THE REDUCTION OF SULFUR DIOXIDE.

(Satt att framstalla svavel medelst reduktion av svavelsyrlighet). Text in Swedish. (Assignee not given.) Swed. Pat. 85,183. 2p., Jan. 9, 1956. (Appl. Sept. 6, 1955, 10 claims).
A. R. Lindblad.
Identifiers: *By-product recovery, *So2 removal (combustion products), *Reduction, Sweden, Stack gases, Coal, Fuel gases, Control equipment, Design criteria, Sulfur compounds.

The gas mixture containing sulfur dioxide is introduced into a specially constructed chamber, where it is heated by the hot reaction products produced by the reduction process. The SO2 mixture is passed through one or more channels arranged inside the reaction chamber or along its periphery, and moves in the opposite direction to the gases formed by the reaction. Thus, the mixture containing SO2 may be introduced near the lower end of the reaction chamber, after which it moves upward through the chamber, absorbing the heat of reaction as it goes. It comes in contact with the reducing agent (which can be a gas) at the top of the chamber and moves downward as they react. The sulfur produced by the reduction process is removed from the bottom of the apparatus. Producer gas or blast furnace gas can be used as the reducing agent, or possibly powdered coal.
APTIC-25795

CATALYTIC HYDRODESULFURIZATION OF HEAVY FUEL OILS.

Chem. Age India, 14 (6):457-462, Sept. 1963. 13 refs.
Y. B. G. Varma, and D. Venkateswarlu.
Identifiers: *Hydrodesulfurization, Asia, Catalysts, Pressure, Temperature.

On the basis of industrial applications, the fuel oils used in the U. S., West Germany, the United Kingdom, and India are classified into five different categories. The specifications for each category are noted, as is the sulfur content of each category permitted by American, West German, and Indian standards. With the increasing need for low-sulfur fuels, hydrodesulfurization is becoming increasingly important. Variations in the five principle commercial hydrodesulfurization processes are discussed. In general, these methods use pressures of 10 to 250 atm, temperature from 300 to 500 C, and compounds of nickel, tungsten, cobalt, and molybdenum as catalysts.
APTIC-25797

TEMPERATURE CHARACTERISTICS OF FIBRE FILTERS.

House of Scientific Workers, Liblice, Czechoslovakia, Proc. Nat. Conf. Aerosols, 1st, Liblice, 1962, p. 257-264. 12 refs. (Oct. 8-13.)
J. Pich, and B. Binek.
Identifiers: *Fiber filters, *Mathematical analyses, *Temperature, Czechoslovakia, Aerosols, Particle size, Filters, Flow rates, Gases, Density.

The efficiency of a fiber filter as a function of the temperature of the carrier gas was studied theoretically and experimentally. Consideration of the role of particle diffusion, interception, and inertia in the process of aerosol filtration led to the conclusion that dependence on the temperature of the gas being filtered is a curve exhibiting a minimum. The position of this minimum depends on filtering velocity and on particle size and density. With rising velocity and increasing size and density of the particles, the position of the minimum shifts toward higher temperatures. Equations are presented which describe the relationship between particle size and diffusive settling and temperature. Experimental measurements of filtering efficiency at 20-200 C verified the theoretical conclusions.
APTIC-25798

SULFUR DIOXIDE.

Public Works, vol. 92:117-121, Aug. 1963. 6 refs.
Edmund J. Laugusch.
Identifiers: *By-product recovery, *Sulfur dioxide, Combustion gases, Primary metallurgical processing, Sewage treatment, Transportation, Control methods, Chromium compounds, Oxidation, Reduction, Compressed gases, Liquids.

Sulfur dioxide is produced by the combustion of sulfur in special burners, by burning pyrites, or as a by-product of smelting operations. The gas is purified by passing it into water where it is dissolved along with other impurities. The liquor is then heated to vaporize the gas, which is subsequently dried and compressed into liquid form. Two grades of SO2 are produced: commercial, which is suitable for use as a dechlor, and refrigeration. The various physical and chemical properties of the vaporized gas and the liquid are summarized, and instructions are given for handling dry (liquid or gas) SO2 containers during shipment, unloading, storage, and emptying. Design requirements for SO2 pipelines are also noted. In addition, requirements are presented for the use of SO2 in the following reactions significant in water and waste treatment: dechlorination, activating silica, reduction of Cr (6+) to Cr (3+), oxidation, and alkalinity reduction.
APTIC-25808

CONTINUOUSLY WORKING PLANT FOR THE SEPARATION OF NEON-HELIUM MIXTURES.

Cryogenics, 2 (5):290-291, Sept. 1962. 9 refs.
L. Bewilogua.
Identifiers: *Neon, *Compression, *Heat transfer, Germany, Cooling, Compressed gases.

An air-separation plant is described which uses a series of heat exchangers to separate neon from neon-helium mixtures and employs liquid neon as the cooling agent. In contrast to the condensation and adsorption methods for recovering neon from neon-helium mixtures, power requirements are low and high-purity neon (greater than 99.9%) can be continuously tapped off. In addition, investment costs are considerably lower for the liquefaction process and operation is much simpler. Under stationary conditions, up to about 1-6 cu m of mixture per hr can be separated.
APTIC-25809

SULPHUR REMOVAL FROM GASES.

Steam Eng., vol. 6:408-410, July 1937.
David Brownlie.
Identifiers: *Absorption (general), *Catalysts, *Reduction, Great britain, Stack gases, Primary metallurgical processing, Electrostatic precipitators, Scrubbers, By-product recovery, Aluminum compounds, Sulfur compounds, Sulfates, Cooling.

Two processes for removing sulfur dioxide from smelter gases and recovering it as liquefied sulfur dioxide or free sulfur are described. The first process is the Boliden process that is intended for smelter gas rich in SO2 (5-10%) and low in free oxygen. It consists of passing the smelter gases through a bed of red-hot coke to obtain carbon monoxide, then passing the mixture of CO and SO2 over a catalyst composed of ferric oxide and aluminum oxide. The CO is oxidized to CO2 and the SO2 is reduced to free sulfur. The free sulfur liquefies and is partly run off in this form; the rest, after cooling of gases in a heat interchanger, is separated in a very fine state as droplets in an electrostatic precipitator. The second process is the I.C.I. process for smelter gases with a lower SO2 content (2-5%). This process consists of scrubbing smelter gases with a concentrated solution of basic aluminum sulfate, which readily absorbs SO2, and neutralizing the alumina not combined with sulfuric acid. The solution is then heated to the boiling point to decompose the unstable aluminum sulfate-sulfite and to release the SO2 as a concentrated gas. Following this, the SO2 gas is liquefied and can be solid in this condition. However, it is generally reduced to free sulfur by CO gas. About 20 tons of liquid SO2 per day and 5 to 6 tons of free sulfur per day are being produced at an experimental I.C.I. plant. For several years, a commercial Boliden plant has been recovering 20,080 to 25,000 tons of sulfur per year.
APTIC-25814

COAL CLEANING PLANT PROTOTYPE SPECIFICATIONS: A REPORT TO PROCESS CONTROL ENGINEERING DIVISION NATIONAL AIR POLLUTION CONTROL ADMINISTRATION.

McNally Pittsburg, Manufacturing Corp.,
Contract PH 22-68-59, 182p., 1968 (*). NTIS: 196632
Personal Author Not Recorded.
Identifiers: *Costs, *Pilot plants, *Laundering (coal), *Design criteria, Coal, By-product recovery.

Prototype plant specifications are presented for an installation where raw runof mine (R.O.M.) coal will be crushed and washed to obtain a low-sulfur coal and a pyrite-rich refuse. The specifications contain descriptions of all equipment, the building, and the sampling and testing facilities for evaluating performance of individual equipment and analyzing processed coal samples. Equipment costs are itemized.
APTIC-25820

ELECTROSTATIC PRECIPITATION FOR LARGE BOILERS.

Proc. Inst. Mech. Engrs. (London), vol. 181, part 3N:78-89, 1966-1967. 3 refs.
E. R. Watkins, and K. Darby.
Identifiers: *Electrostatic precipitators, *Design criteria, Great britain, Combustion gases, Boilers, Electric power production, Operating variables, Maintenance.

Because it contributes nothing to the overall efficiency of the station in terms of cost per unit generated, the electrostatic precipitator has been the least understood item of equipment at the average power station. The lack of interest has resulted in poor maintenance and operation and thus poor efficiency of gas cleaning. With the increasing awareness of the health hazards from atmospheric pollution, this attitude is changing. Design, operation, and maintenance factors of vital concern if high efficiency is to be maintained are highlighted. Mechanical and electrical design considerations noted include casings, collector systems, discharge systems, insulators, mechanical and static rectifiers, 'sectionalization' of precipitators, hoppers, and automatic control.

Recommendations made for operation and maintenance cover initial commissioning, checks during normal operation, analysis and location of faults, and periodic major overhauls.
APTIC-25833

METHOD AND DEVICE FOR THE DESULFURIZATION OF GASES, ESPECIALLY FLUE GASES AND OTHER WASTE GASES.

(Werkwijze en inrichting voor het ontzwavelen
van gassen, in het bijzonder van rook- en andere
afgewerkte gassen). Text in Dutch. (Grillo-Werke
A. G., Duisburg-Hamborn (West Germany))
Netherlands Pat. 6,601,639. 2p., Aug. 11, 1966.
(Appl. Feb. 9, 1966, 18 claims).
Personal Author Not Recorded.
Identifiers: *Absorption (general), *Alkaline additives, Germany, Stack gases, Coke, So2 removal (combustion products), Design criteria, Hydroxides, Metal compounds, Aluminum compounds, Iron compounds, Magnesium compounds, Manganese compounds, Zinc compounds, Oxides, Aluminum oxides, Iron oxides, Temperature.

Gaseous sulfur compounds are removed from waste gases by a dry or semi-dry process the principal feature of which is an absorbing mass of powdered or fine-granulated material, consisting of a mixture of oxides, hydrated oxides, and hydroxides of aluminum, zinc, iron and/or manganese (the amphoteric component) blended with oxides or hydroxides of the alkaline earth and/or alkali metals (the basic component). When the absorbing mass has become charged with sulfur compounds, it is subjected to dry regeneration at high temperatures. The regeneration includes a roasting stage, during which some of the sulfur present is released, after which the oxides are hydrolized with water and recycled. The dry stage of regeneration is conducted at temperatures of 1000-1200 C, in the presence of coke or some other suitable form of carbon. The second stage takes place at temperatures of 300-800 C, using a mixture of air and water vapor to achieve hydration of the oxides. More specifically, the oxide mixture can consist of a mixture of magnesium and manganese hydroxides, with the possible admixture of iron. The method is best utilized with the aid of specially designed equipment, such as a series of rotors located one above the other on a common shaft, each rotor turning within a separate reaction chamber.
APTIC-25838

ON PROTECTION AGAINST EMISSION: REMOVAL OF OFFENDING SMELLS.

(Zum Thema 'Immissionsschutz': Versuch der
Geruchsbeseitigung). Text in German.
Landtechnik, 25 (21):672-674, Nov. 1970.
Stefan Schirz.
Identifiers: *Farms, *Odor counteraction, Animals, Cattle, Goats, Hogs, Poultry, Sheep, Germany, Odors, Food and feed operations, Maintenance.

While offending smells emitted by agricultural enterprises raising large numbers of domestic animals for meat production are of low significance in the overall pollution picture, large scale animal farming is on the increase. In West Germany, the pig population increased by 120% since 1950 while the number of farms decreased by 52%. The use of chemicals to control the smells emitted presents no solution to the problem; on the contrary, this approach aggravates it because the chemicals emit their own pollution. Chemical processes allegedly destroying the smelly substances must be viewed with skepticism; it is more probable that the chemical reaction takes place on the nasal membrane which is de-sensitized to the smell. Similar caution is indicated in the case of ionization because ozone requires a long contact time to be effective and these conditions do not prevail in agriculture. Technical control methods including purification of air by scrubbers, filtering of air, and combustion of smells in the air are too expensive to be feasible. The only inexpensive and effective approach is the prevention of smells by the maintenance of maximal cleanliness in barns, pig pens, or chicken houses, by maintaining an optimal climate in these enclosures, by separating air emanating from manure pits from barn air, by mechanical cooling of manure piles and pits, and by covering open manure piles, containers with muck, and silos containing fermented feed.
APTIC-25858

DUST REMOVAL, KEEPING AIR CLEAN AND REFUSE DISPOSAL.

(Entstaubung, Reinhaltung der Luft und
Abfallbeseitigung). Text in German. Chemiker Z.,
94 (20):794-803, Oct. 20, 1970.
Friedmund Rueb.
Identifiers: *Commercial equipment, *Control equipment, Commerical firms, Meetings, Germany, Dusts, Coal, Incineration, Measurement methods, Commerical equipment, Collectors, Centrifugal separators, Electrostatic precipitators, Filters, Bag filters, Scrubbers, Venturi scrubbers, Wet cyclones, By-product recovery, Ventilation.

Installations and devices for dust removal, for the removal of gaseous effluents and of aerosols, air filters, ventilators, refuse incinerators, and pollution measuring devices exhibited at the Achema Fair (Ausstellung fuer Chemische Apparate in Frankfurt, West Germany) are described. They include the dust removal and reclamation aggregate built by Altenburger Maschinen KG (Hamm), the downdraft area filter of the BHS Apparatebau (Peiting), the waste gas dust removal installation for refuse incinerators of the CEAG (Dortmund), dust arresters and reclamation apparatus of the DCE Entstaubungsanlagen GmBH (Essen), a fully automatic bag filter built by Eisenwerke GmBH (Kaiserslautern), a low pressure centrifugal venturi dust arrester by Rich. Engels (Bochum), a wet dust arrester for coal dust by Euroform (Aachen), dust arresters by Jakob Handte Co. (Tuttlingen), a bag filter by IBAG AG (Neustadt), a new venturi scrubber by Otto Keller (Jesingen), a fabric filter by Lugar GmBH (Herne), Siemens dust arresters built by Luitpoldhuette AG (Amberg), a wet electrofilter by Neuzeitliche Verbrennungs und Waermetechnik GmBH (Weisskirchen), a centrifugal agglomerator by Hugo Petersen (Wiesbaden), an enameled cyclone by Pfaudler Werke AG (Schwetzingen), a fast exchange filter by Pulverizing Machinery GmBH (Koeln), reclaiming installations by Riedel GmBH (Bielefeld), cyclones by Aug. Schnackenberg Co. (Wuppertal), a hot gas filter by Wilh. Schuler Filtertechnik GmBH (Eisenberg), a dust filter by Adolf Zimmermann (Osterbruken), a wet electrofilter by Airfilter Co. (Bad Friedrichshall) and 40 other types of dust and gas handling equipment.
APTIC-25860

METHOD AND APPARATUS FOR RECYCLING DRYER STACK GASES.

(Stearns-Roger Corp., Denver, Colo.) U. S. Pat.
3,538,614. 5p., Nov. 10, 1970. 3 refs. (Appl. Sept.
9, 1968, 6 claims).
Ervin C. Weimer, Harold W. Shideler, and Stuart
M. Porter.
Identifiers: *Combustion gases, *Kraft pulping, *Drying, Particulates, Secondary air, Inertial separation, Design criteria, Combustion, Cooling, Temperature.

The conventional pulp-drying installations include a gas-fired furnace, the gaseous products of combustion of which are fed into a rotating drum-type dryer containing wet pulp. The dried product emerging from the discharge end of the dryer is either recovered directly or else sucked up by an induced draft fan and fed to one or more cyclone-type recovery vessels where the dry product is drawn off the bottom while the gaseous elements are discharged through the top. By returning the gases and entrained solids to the system at the proper point, the solids can be incinerated without the oxygen-lean recycled gases acting to inhibit combustion. Also, these same lean recycled gases can be combined with the gaseous products of primary combustion to produce a substantially inert mixture which will not support combustion in the dryer section or bring about detrimental oxidation of the product. By using the recycled stack gases to cool the hot, undiluted primary combustion gases, the conventional practice of using secondary air from the atmosphere as a coolant is eliminated. All components of the recycling system must be maintained at a temperature somewhat higher than the dew point of these recycled gases, or the condensible fractions will condense out on the cold surfaces and entrap the entrained solids so as to eventually clog the ductwork. While the amount of heat recovered by burning the entrained solids is not great, it, together with the heat saved by using the already warm stack gas as secondary air instead of air from the atmosphere, combine to bring about an overall fuel saving of somewhere between 5 and 8%.
APTIC-25863

ELECTROSTATIC SEPARATOR.

(Assignee not given.) U. S. Pat. 3,540,191. 6p.,
Nov. 17, 1970. 15 refs. (Appl. Jan. 29, 1968, 9
claims).
Marc Victor Edgard Herman.
Identifiers: *Electrostatic precipitators, *Design criteria, Belgium, Dusts, Maintenance, Corona.

An electrostatic separator is described which comprises a pre-ionization zone and an attracting zone, each provided with two sets of electrodes, of which one set in the pre-ionization zone forms the emitting electrodes. Each emitting electrode comprises a thin metal strip laid out in a transverse plane with reference to the direction of flow of the gas to be separated. The strips provide stiffer elements than the filaments previously used as emitting electrodes, and are therefore less sensitive to vibrations during the transport and operation of the dust separator. Preferably, the emitting strips are inclined towards the attracting zone, which offers the advantage that the electrons emitted by the corona effect are directed towards the adjacent electrode of opposite potential, under an angle exceeding 90 deg. This displacement of the electrons causes an air draught through the electro-separator in the direction of flow of the gas to be separated, which reduces correspondingly the head losses usually encountered in electrostatic separators. The separator also comprises cleansing members extending substantially parallel to the direction of flow of the gas to be separated.
APTIC-25864

POWER, POLLUTION, AND THE IMPERILED ENVIRONMENT. II. EAST, MIDWEST, AND WEST COAST: POLLUTION-CONTROL PLANS OF SOME MAJOR UTILITIES; ROLE OF GOVERNMENT IN ENVIRONMENTAL MATTERS; OTHER PROPOSED SYSTEMS FOR REDUCING STACK EMISSIONS.

IEEE (Inst. Elec. Electron. Engrs.) Spectrum, 7
(12):65-75, Dec. 1970. 3 refs.
Gordon D. Friedlander.
Identifiers: *Electric power production, Stack gases, Fly ash, Natural gas, Nuclear power plants, Steam plants, Electrostatic precipitators, Coal preparation, Gasification (synthesis), So2 removal (combustion products), Alkaline additives, Compressed gases.

A number of the largest utility companies are embarking on large-scale nuclear generating plant construction programs that may phase out up to 50% of their fossil-fuel stations by the end of the 70's. This move is being encouraged by electrical suppliers who, with the utilities and the AEC, are striving to convince the public that nuclear stations are completely safe and provide the best means for air-pollution abatement. Nevertheless, many fossil-fuel plants are still being planned and built, and more efficient methods of reducing stack gas emissions will have to be incorporated at these facilities if a general reduction in air-pollu-

tion levels is to be achieved while simultaneously meeting the accelerating demand for more energy. Government, too, has a role to play and a responsibility to fulfill in the public interest by enacting fair and practicable pollution-control legislation, and ensuring the enforcement of such statutes. (Author abstract modified)
APTIC-25867

EXAMPLES OF CITY-GAS COMBUSTION IN BOILERS.

(Boira ni okeru toshigasu no nenshorei). Text in Japanese. Netsu Kanri (Heat Management: Energy and Pollution Control), 22 (10):23-29, Oct. 30, 1970.
Personal Author Not Recorded.
Identifiers: *Boilers, *Fuel oils, *Natural gas, Japan, Residual oils, Operating variables, Design criteria, Flow rates, Temperature, Vapor pressure.

A 15 t/h boiler was revamped to compare the thermal efficiency and the automatic combustion control (ACC) operation for cases when heavy oil and natural gas are used for fuel. A complete description of the gas burner (dual fuel burner) including the tabulation of specifications, schematic diagrams, flowcharts, and operational data are presented. The operational data are given for combustion period, steam flow, vapor pressure, water supply flow rate, water supply temperature, gas flow rate, gas pressure, temperature of air entering and exiting the heat exchanger, temperature of exhaust gas entering and exiting the heat exchanger, percentage composition of exhaust gas (02 and CO_2), and the outdoor temperature. The boiler efficiency is increased by a few percent using gas, and high efficiency lasts longer. Within the load variation range of 20 t/h to 5 t/h, ACC is applicable. The use of gas contributes to endurance under over-loading; at low loads, the efficiency of the boiler is much higher than when heavy oil is used. There is no pollution by soot and dust and little damage to the boiler itself, water pipes, and other parts.
APTIC-25868

THE BEHAVIOR OF THE AIR GERM COUNT IN AN ELECTROSTATIC FIELD.

(Das Verhalten der Luftkeimzahl unter dem Einfluss eines elektrostatischen Feldes). Text in German. Z. Ges. Hyg. (Berlin), 16 (10):808-809, Oct. 1970. 3 refs.
Gert Schreinicke, and Heinz Schaffernicht.
Identifiers: *Microorganisms, *Electrostatic precipitators, Germany, Buildings, Particle counters.

Eighteen ceiling electrodes of 1 sq m surface, each installed in an office room, were charged with a charge of plus 7000 V. The steel construction in the flooring acted as a counterelectrode; thus, an electrical field of approximately uniform 2800 V/m intensity was created. The germ count was determined by a device described by Hoesel and Steiniger which analyzes 65 liters air in 2 minutes. Forty germ counts were made with and without the electric field in operation. No germ identification was made. Without the electric field, 1 cu m air contained 210 germs. This number was reduced to 68.6% after 1 hour exposure of the room atmosphere to the effect of the electric field. After 2 hours, the germ count decreased to 47.6%; after 3 hours, to 44.3%; and after 4 hours, to 40.0% of the original count. No further drop occurred. Germs are set in motion by the electrostatic field and migrate along lines of force to the electrodes. In contrast with chemical determination methods by disinfection, the electrostatic method is absolutely harmless. The bacteriostatic effect of the method was not studied.
APTIC-25877

THE STUDY OF MAINTENANCE OF AIR-CLEANING DEVICES AS AIR POLLUTION CONTROL MEASURE.

(Taiki osen taisaku to shite no kukiseijosochi no ijikanri ni kansuru kenkyu). Text in Japanese. Kuki Seijo (Clean Air-J. Japan Air Cleaning Assoc., Tokyo), 8 (5):1-17, Nov. 1970.
Personal Author Not Recorded.
Identifiers: *Air conditioning equipment, *Maintenance, Japan, Buildings, Dusts, Electrostatic precipitators, Filters, Glass fabrics, Treated fabrics.

The use and maintenance of air purification devices installed in buildings was studied. The on-site survey covered 48 buildings located in various parts of Metropolitan Tokyo. The air intake port of the equipment was mostly on the roof (62.5%). Mono-duct air conditioning systems accounted for more than 43%, followed by fan coil systems accounting for 21%. As to air filters, 48.4% were panel types and 28%, automatic winding types. Electrical dust collector types were 14%. Fifty-six percent of the filters were of synthetic fibers and 25% of glass fiber. More than half (54%) were equipped with manometers while almost all the buildings surveyed used the system taking in fresh air for about 30%. The filter was replaced regularly once or twice a year (86%) or when pressure loss was noted (14%). The air purifier's performance as affected by atmospheric dust during actual use was also surveyed in order to obtain fact-based criteria for maintenance and life of the purifier. Data obtained from this survey included optical density of atmospheric dust and the relationship between the optical density and air purifier's pressure loss and/or weight increase (quantity of dust arrested). An air purifier installed in a building chosen from a number of buildings was examined for a number of performance aspects to gain more concrete data on the actual use. Using a static type filter, pressure loss began to rise initially from about 8 mm water column and finally reached 19.5 mm in 60 days. With a newly exposed filter, dust collecting efficiency was low for the first week or so but drastically increased in the second and the third weeks to reach the peak of 26%. The percentage repeated in a 20-day declining cycle. Based on the findings, it was found impractical to use the initial dust collecting efficiency or pressure loss as a criteria to judge the life of an air filter, although such is presently used as the indicator.
APTIC-25880

DESULFURISATION PROCESS IN WHOLE INDUSTRIES. PART I.

(Datsuryu purosesu no subete. Ichi). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 6 (11):859-865, Nov. 1970. 31 refs.
Mikio Harima.
Identifiers: *So2 removal (combustion products), Japan, Limestone, Combustion gases, Scrubbers, By-product recovery, Catalytic oxidation, Absorption (general), Alkaline additives, Alkalized alumina (adsorption), Manganese dioxide (japanese), Reinluft process (adsorption), Sulfuric acid, Ammonia, Carbonates, Magnesium compounds, Manganese compounds, Potassium compounds, Sodium compounds, Oxides, Sulfates, Hydrogen sulfide, Sulfites, Catalysts, Reduction.

Various kinds of desulfurization processes available today are discussed. For Wet Methods, a number of processes are being developed. One of them is the CE (Combustion Engineering Co.) method featuring a preliminary process in which alkaline earth is injected into the furnace before wet washing. This method can remove 20-30% of sulfur dioxide and sulfur trioxide. Another is Wellman-Lord process further classified into Sodium and Potassium methods. The first pilot plant of this system, installed at Tampa Electric Co. gave a removal rate of SO_2 of over 90%. Other representative processes falling under this category include Molten Carbonate Process, Ammonia and Lime Process, Showa Denko Process, and Grillo Method. Molten carbonate process was developed for removal of SO_2 and recovery of hydrogen sulfide. Two absorption methods, Ammonia and Lime Processes, are being developed. Water and sulfurous acid ammonium are produced by the reaction between ammonia and SO_2. Acid ammonium sulfite is also produced in the process. These reaction products are cooled and scrubbed while gas is discharged into the atmosphere. In the oxidation device, ammonia reacts with acid sulfur dioxide to produce sulfite while ammonium sulfite is reduced to ammonium sulfate by means of oxidation. Subsequent drying of these crystallized products are at present in the testing stage. This process gives 90% desulfurization efficiency. In the Showa Denko Method, ammonia is injected into the combustion gas, air is preheated, and then treated with water washing, producing NH_4, HSO_3 and $(NH_4)SO_3$. This method assures perfect drying and recovery of ammonium sulfite and SO_2 removal efficiency of 90%; but it is not used in actual practice. Grillo Method developed by Zink Industrie Wilhelm Grillo Co. uses manganese oxide and magnesium hydroxide as recovery agents to reduce recovered sulfur to sulfuric acid. Under Absorption or Dry Methods are Lurgi Sulfacid, Hitachi, and Reinluft Processes. Additive Injection Methods featuring use of powdered dry lime in the furnace include Alkalized Alumina, DAP-Mn, and Still Processes. Most representative of Catalyst Oxidation Method are Monsanto Cat-Ox Process and Kiyoura Process.
APTIC-25882

RECOVERING ELEMENTAL SULFUR FROM WATERS CONTAINING HYDROGEN SULFIDE.

(Freeport Sulphur Co., New York, N. Y.) U. S. Pat. 3,531,251. 5p., Sept. 29, 1970. 7 refs. (Appl. March 11, 1969, 11 claims).
Vas Hubert Brogdon.
Identifiers: *Catalytic oxidation, *Packed towers, *Peter spence process (claus), *Hydrogen sulfide, Combustion gases, Boilers, By-product recovery, Design criteria, Nitrogen, Aluminum oxides, Sulfur compounds, Catalysts, Cooling, Water, Temperature.

A process is described for treating water containing hydrogen sulfide with an inert gas without the introduction of external heat. The water is introduced into a packed tower or stripper, being subjected to a counter-current upward flow of a stream of inert oxygen-free gas, consisting essentially of nitrogen. The inert gas stream, which now also contains the major portion of the hydrogen sulfide content, is removed from the top of the stripper and conducted into a boiler-furnace, a standard piece of equipment customarily used in the Claus project. Mixed with air, the gases are burned to furnish enough sulfur dioxide to react substantially with the remainder of the hydrogen sulfide to form elemental sulfur and leave a slight excess of about 1 mol percent SO_2. Combustion products from the furnace are passed into a converter which contains a hot bed of bauxite or activated alumina, which causes the H_2S and SO_2 to react with one another to form elemental sulfur vapor and water vapor admixed with the nitrogen in the gas stream. Cooled to a temperature of about 300 to 400 F, the sulfur vapor condenses as liquid sulfur. A portion of the non-condensible gases is recycled to a combined gas cooler-water treater to react the SO_2 with the H_2S contained in the water stream produced in the first step.
APTIC-25884

AIR POLLUTANT REMOVAL APPARATUS HAVING HORIZONTAL BED FOR AIR-LIQUID CONTACT.

(Assignee not given.) U. S. Pat. 3,528,781. 7p., Sept. 15, 1970. 4 refs. (Appl. Jan. 26, 1968, 9 claims).
Stanley Gelfman, and Amos Turk.
Identifiers: *Alkalized alumina (adsorption), Combustion gases, Particulates, Centrifugal separators, Spray towers, Design criteria, Aluminum oxides.

An apparatus is described for the removal of gaseous impurities and also fine, entrained particles from the air, which are deleterious or obnoxious to human beings. It is particularly suited for the removal of sulfur dioxide and other acidic gases as well as particulates. The apparatus comprises an electric motor with a shaft extending both above and below the motor, at the upper end of which there is attached a centrifugal blower wheel. Below the motor there is attached to the shaft a combined fluid pump and sprayer; the sprayer has a series of circumferentially spaced holes, preferably on different vertical levels. The fluid pump, which is below the spray head, has a plurality of vertically positioned vanes projecting centrally from the inner surface of the pump, which is positioned vertically as is the sprayer. There is a stationary, horizontal pollutant contact bed below the level of the holes in the sprayer, having a tapering hole at approximately its center through which the correspondingly tapering liquid pump extends, forming a snug fit between the two but permitting the pump to revolve. For the removal of sulfur dioxide or other acidic substances, this contact bed is activated alumina that has an impregnation of sodium carbonate on its multiple surfaces of the subdivided, granular substance.
APTIC-25885

AIR POLLUTION FROM MOTOR VEHICLES.

Battelle Res. Outlook, 2 (3): 12-16, 1970.
David A. Trayser, and Frederick A. Creswick.
Identifiers: *Internal combustion engines, *Automotive emission control, Emission standards, Automotive emissions, Engine exhausts, Crankcase emissions, Blowby, Fuel tank evaporation, Carburetor evaporation losses, Natural gas, Electric propulsion, Gas turbines, Stratified charge engines, Steam engines, Vehicles, Catalytic afterburners, Air-fuel ratio, Hydrocarbons, Carbon monoxide, Nitrogen oxides.

Vehicles powered by internal combustion engines have been identified as the greatest single source of air pollution in the United States. Unburned hydrocarbons show up in the gasoline-engine exhaust largely because of a wall-quench phenomenon. Oxides of nitrogen result to a great extent from the high cylinder pressure and high peak combustion temperature that are typical of the internal combustion engine, while a fairly large amount of carbon monoxide is an equilibrium component of the products of combustion at high temperatures. Gases from the crankcase and fuel vapors from the tank and carburetor also count as a source. Both California and Federal standards for 1970-1980 exhaust emissions are cited, as well as evaluation methods. Crankcase blowby control, exhaust emission control, and evaporative emission control are mentioned. Engine modifications include varying the fuel/air ratio, exhaust gas recirculation, and the stratified charge engine. Exhaust-manifold reactors and catalytic devices are discussed, as well as alternate fuels. Natural gas has been suggested. Electric vehicles, steam engines, and gas turbines are reviewed as alternative power sources.
APTIC-25886

MAINTENANCE AND MANAGEMENT OF AIR-CLEANING DEVICES IN FACTORIES.

(Kojo ni okeru kukiseijo sochi no ijikanri). Text in Japanese. Kuki Seijo (Clean Air-J. Japan Air Cleaning Assoc., Tokyo), 8 (5): 40-54, Nov. 1970. 7 refs.
Shoji Ito.
Identifiers: *Exhaust systems, *Inspection, *Maintenance, Regulations, Occupational health, Respiratory diseases, Japan, Dusts, Filters, Ventilation.

The legal provisions for types of work requiring air purification and other preventive measures needed to sustain workers' health and safety are presented. The statistical data nationally compiled on administrative guides given to respective branches of industry are tabulated. The discussion centers around purification of dusty air required under the industrial lung disease prevention regulations, and on the local ventilation (air exhaust) systems specially provided for that purpose. A few sample forms in which to record regular inspection findings are shown for suggested use. Item by item discussion, using those columns indicated in the sample record forms for inspection of local ventilation system includes what is to be inspected and what would be the possible causes for each defect listed in detail. For inspection of the hood, check-points include general condition and air-intake efficiency. Duct diameter, static pressure, velocity pressure, wind velocity, and wind volume are the items to be inspected for ducts. For the air filter unit, the inspection items include water consumption, pressure loss, total operating hours, dust/debris collection, and purification (dust removal) efficiency. Fan and motor units were other main components to be regularly inspected. The check-points are rpm, voltage, current, wind pressures in static and dynamic states, and wind volume.
APTIC-25889

CLEANING OF DUST SEPARATING APPARATUS.

(Aerodyne Machinery Corp., Hopkins, Minn.) U. S. Pat 3,540,193. 6p., Nov. 17, 1970. 8 refs. (Appl. July 12, 1968, 1 claim).
Josef Pausch.
Identifiers: *Dusts, *Filters, Maintenance, Design criteria, Compressed gases, Pressure.

A method is described of utilizing a high energy gas for the purpose of closing the communication between portions of a filtering system, to build up pressure in a portion of the system on one side of a porous filtering surface and to cause discharge of accumulated solids on the opposite side of the surface. A reservoir of compressed air is used for dislodging the accumulated dust, while a timing mechanism permits escape of the high pressure air. The principal advantage of the present invention resides in the efficiency of the system, and in the simplicity of control. By utilizing the energy of the flow of the compressed gas to close a portion of the system, the need of more costly controls and/or motors is eliminated. Likewise, since the freeing of the accumulation on the filters reduces the pressure within the system, the control valve will open under the influence of gravity, and again obviate the need of controls and/or motors. Another advantage is in the saving of energy for operating the system. The principal energy required is to operate the compressor which supplies gas under pressure to the reservoir, and this can be considerably less than the total energy for other types of systems.
APTIC-25892

LIQUEFIED NATURAL GAS AS INDUSTRIAL FUEL.

(Kogyoyo nenryo to shiteno ekika tenengasu (LNG)). Text in Japanese. Netsu Kanri (Heat Management: Energy and Pollution Control), 22 (10):30-38, Oct. 1970.
Akio Kusama.
Identifiers: *Natural gas, *Furnaces, *Compressed gases, Japan, Metal fabricating and finishing, Paint manufacturing, Primary metallurgical processing, Chemical composition, Methanes.

The characteristics, composition, storage, and applications of liquefied natural gas are presented. Its advantages as an industrial fuel include the high-calory, sulfur-free composition as compared with liquid propane gas (LPG), a byproduct of the petrochemical industry. Methane (CH), the main component of LNG, measures 1.4 m per 1 kg or 1/600 when in the gas state at 0 C under atmospheric pressure. It can be condensed to 0.0024 m per 1 kg when liquefied at -162 C under atmospheric pressure, thus making it easy to transport in large volumes. LNG can be stored most economically at -162 C and under normal atmospheric pressure. Although it is now usually stored in a double-structure metal tank installed on or above the ground, an underground tank is expected to become prevalent for storage of large volumes of LNG. Production of LNG in Alaska and Brunei in connection with Japan's LNG Induction Program are also briefly mentioned. The features or advantages of LNG are as follows: 1) no pollution problem; 2) safe even when it leaks into air, since its specific gravity is smaller than air and therefore does not stay on or immediately above the ground; and 3) gives excellent characteristics as fuel. It is also very economical. When used in large volumes, it costs only 50-60% of electric power. LNG can be particularly advantageously used as fuel for forging furnaces; copper, copper alloy, or aluminum melting furnaces; annealing furnaces; atmospheric gas generation equipment; bake-on paint drying furnaces; and for liquor-heating underwater burners and gas cutting or welding.
APTIC-25893

CONTROL TECHNIQUE OF MOBILE EXHAUST EMISSION.

(Enjin ni okeru haiki gasu boshigijutsu no tenbo). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 6 (11):851-858, Nov. 1970.
Takashi Kobayakawa.
Identifiers: *Automotive emission control, Air quality criteria, Japan, Engine exhausts, Smog, Gasolines, Automobiles, Catalytic afterburners, Flame afterburners, Fuel additives, Hydrocarbons, Lead compounds, Carbon monoxide, Nitrogen oxides.

Reviews and comments on automobile exhaust emission control technology are presented. The criteria established toward reduction of various pollutants that have to be met by 1973 and 1975 are also discussed. The need to establish control criteria based on more scientific research and their data is pointed out. No environmental control criteria except for carbon monoxide has yet been established for automobile exhaust. Much more time is necessary to define criteria for nitrogen oxides, hydrocarbons (HC), lead, or particulates in the exhaust gas. The formation mechanism of photochemical smog remains yet to be clarified, particularly in Japan where the study of emission factors such as NOx and HC is lagging. To meet the criteria by 1975, the measures being taken or conceived include the development of exhaust gas purifiers and lead reduction of gasoline. Exhaust reactors, catalyst converters, and afterburners are the purifiers. Each has problems to be solved such as how to keep the exhaust gas at high temperature for reaction with the exhaust reactor, the development of catalysts made of low-cost material such as copper, manganese, and iron, and availability of material withstanding the burning temperature of over 1000 C for the afterburner. Lead reduction is not as simple as is generally assumed. A perfectly lead-free gasoline is said to cause damage in the valves, contributing to further pollution, but automobile manufacturers in Japan are said to come up with cars that can use lead-free gasoline.
APTIC-25894

RESEARCH AND DEVELOPMENT OF AIR POLLUTION CONTROL TECHNOLOGY IN THE UNITED STATES. PART II.

(Amerika ni okeru taiki osen boshi gijutsu no kenkyukaihatsu. Ni). Text in Japanese. Sangyo Kogai (Ind. Public Nuisance), 6 (11):643-647, Nov. 1970.
Takeshi Yamada.
Identifiers: *Research programs, *United states, *So2 removal (combustion products), Abatement, Control agencies, Federal governments, Japan, Stack gases, Dusts, Smokes, Absorption (general), Alkaline additives, Alkalized alumina (adsorption), Nitrogen oxides.

The air pollution prevention technology in the U. S., mainly smoke elimination and desulfurization are outlined. Wide-scale research commissioned to

private organizations and universities and ranging from very basic studies to full-scale tests, is being performed. Japan is perhaps a little ahead of the U. S. in smoke elimination and desulfurization, but Japan will also be able to develop new methods, learning from the extensive research going on in the U. S. The Wellman-Lord method, Monsanto method, and Alkalized Alumina method are described. The themes of studies commissioned to private research organizations and universities by Process Control Engineering of the National Air Pollution Control Administration's Bureau of Engineering and Physical Science and the limestone method, coal screening method (pyrite elimination), fluid layer combustion, and development of new methods. Various studies on dust prevention and elimination of nitrogen oxides conducted within PCE itself are also described.
APTIC-25895

DEVICE FOR FILTERING SOLIDS FROM A GAS.

(Aerodyne Machinery Corp., Hopkins, Minn.) U. S. Pat. 3,538,687. 3p., Nov. 10, 1970. 6 refs. (Appl. July 12, 1968, 1 claim).
Josef Pausch.
Identifiers: *Bag filters, *Design criteria, Dusts, Filters, Maintenance, Gases, Solids.

A new mode of mounting a tubular porous filtering element in a system adapted to separate solids from a gas is described in which provisions are made to facilitate the handling of the elements in such a manner as to increase their efficiency. A cylindrical wire frame, preferably formed with a spiral strand, is adapted to be connected to the interior surface of a depending collar, either by the spiral strand forming the body of the frame, or an additional spiral strand that is wound about vertical reinforcing strands. A porous envelope circumscribes both the frame and the collar and is secured to the collar by a flexible band. This arrangement provides for easy disassembly and rotation of the envelope with respect to the remaining structure. (Author abstract modified)
APTIC-25908

GAS FILTER BAG STRUCTURE.

(American Air Filter Co., Inc., Louisville, Ky.) U. S. Pat. 3,537,241. 3p., Nov. 3, 1970. 2 refs. (Appl. April 21, 1969, 2 claims).
John W. Wiegel, and Paul L. Brooks.
Identifiers: *Bag filters, *Design criteria, Maintenance, Gases.

An improved support arrangement for gas filter bags is described in which the mouth portions of two or more side-by-side bags are held in open position by a rigid, easily insertable mouth-shaping member. The opposite ends of the bags are inserted in a channel-shaped flow-through border frame sized to hold the mouth portions in fast side-by-side position. The sides of the rigid mouth-shaping members are concave in cross-section so that adjacent mirror-image sides of the members provide pockets for support of the mouth portions. The structure avoids past problems, since construction is relatively simple and low in cost, installation and removal are quick, and maximum access is provided. It also avoids the application of expensive sealant materials along the bag edge.
APTIC-25909

APPARATUS FOR CONTROL OF AIR POLLUTION.

(Assignee not given.) U. S. Pat. 3,530,647. 6p., Sept. 29, 1970. 24 refs. (Appl. Feb. 1, 1965, 3 claims).
Bertha Wetzel.
Identifiers: *Particulates, *Spray towers, *Steam, Combustion gases, Furnaces, Stacks, Internal combustion engines, Automotive emission control, Design criteria, Heat transfer.

An apparatus for the control of air pollution is described which employs the use of superheated steam to precipitate all solid waste particles from exhaust gases. Incomplete combustion in furnaces and in automobile engines causes impurities to be discharged to the atmosphere which affect the general health when breathed over long periods of time. The apparatus consists of a flue which has an interior peripheral wall; a hollow steam distributor ring is mounted peripherally in the flue wall, the surface of which is substantially flush with the interior wall of the flue. The ring has a plurality of spaced apart distributor nozzles protruding radially inwardly beyond the interior wall of the flue; a conduit passes through the flue wall and connects the ring to a source of superheated steam.
APTIC-25910

ELECTROCHEMICAL PROCESS FOR RECOVERING SULFUR VALUES.

(North American Rockwell Corp., Canoga Park, Calif.) U. S. Pat. 3,531,386. 5p., Sept. 29, 1970. 4 refs. (Appl. Nov. 26, 1968, 5 claims).
Laszlo A. Heredy.
Identifiers: *Absorption (general), *Electrolysis, Stack gases, Chemical processing, Electric power production, Metal fabricating and finishing, Electrochemical methods, By-product recovery, So2 removal (combustion products), Design criteria, Carbonates, Carbon dioxide, Oxygen, Sulfur compounds.

A method is described for recovering sulfur values from molten salt compositions using inexpensive readily available materials and avoiding the use of expensive equipment. Sulfur oxides, principally as sulfur dioxide, are present in the waste gases discharged from many metal refining and chemical plants and in the flue gases from electric power plants. The electrochemical recovery of sulfur values from the molten salt as sulfur oxides in the anode compartment, and the simultaneous formation of alkali metal carbonate in the melt in the cathode compartment, is accomplished by feeding the molten salt composition to the anode compartment while simultaneously using carbon dioxide and oxygen as cathodic feed material.
APTIC-25913

MAINTENANCE AND MANAGEMENT OF AIR-CLEANING DEVICES IN OFFICE BUILDINGS.

(Jimusho biru ni okeru kukiseijo sochi no ijikanri). Text in Japanese. Kuki Seijo (Clean Air-J. Japan Air Cleaning Assoc., Tokyo), 8 (5):34-39, Nov. 1970.
Naoki Kasahara.
Identifiers: *Air conditioning equipment, *Electrostatic precipitators, *Maintenance, Japan, Buildings, Exhaust systems, Filters, Inspection.

Maintenance procedures for air filters for electrostatic precipitators as well as multi-panel-type air filters are given. Other items include inspection and cleaning, the different types of air filters,problems encountered in the maintenance of air filters (such as the exhaust system of restaurants and employee dining rooms), construction of exhaust systems for kitchens, the structure of ducts and their inspection, and fire-proof dampers. Concerning the maintenance of air filters in office buildings, the important items are combination use of air filters and the choice of air filters. In addition, various checkpoints for electrostatic as well as multi-panel type air filters and self-winding type air filters (unwoven) are listed.
APTIC-25915

A PROCEDURE FOR THE SPECIFICATION OF DISTRIBUTOR PUMPS FOR HIGH VOLUME PRODUCTION.

Preprint, Society of Automotive Engineers, Inc., New York, 20p., 1969. 1 ref. (Presented at the National Farm, Construction and Industrial Machinery Meeting, Milwaukee, Wis., Sept. 8-11, 1969, Paper 690602.)
P. Howes.
Identifiers: *Diesel engines, *Timed fuel injection, *Design criteria, Equipment criteria, Great britain, Smokes.

The C.A.V. distributor pump was developed over the past 15 years to meet the need of the European diesel industry for a pre-set pump suitable for high volume engine production. The procedure for arriving at F.I.E. specifications, starting with initial trials and working through to final production rehearsal is described. A 'master pump' system is used for monitoring and controlling production fuel levels. Among other factors brought out in this paper are delivery curve shape control, choice of advance curve and its influence on smoke, efficiency, and cylinder pressures. (Author abstract)
APTIC-25923

TRENDS IN THE UTILIZATION OF THE MOST IMPORTANT FORMS OF SULFUR-CONTAINING RAW MATERIAL.

(O napravleniyakh ispol'zovaniya vazhneyshikh vidov serosoderzhashchego syr'ya). Text in Russian. Khim. Prom. (Moscow), no. 1:17-20, 1964.
V. V. Krasnushkin.
Identifiers: *Industrial emission sources, *By-product recovery, *So2 removal (combustion products), *Trends, *Sulfur dioxide, *Hydrogen sulfide, Ussr.

Utilization of the three most important sources of sulfur (sulfur dioxide and hydrogen sulfide in waste gases of the ferrous and and nonferrous metallurgical, chemical, petroleum, and other industries; sulfur pyrites; and elemental sulfur) is reviewed in the light both of growing industrial demands for sulfur, and the increasing need for air pollution control. It is anticipated that almost all waste gases containing more than 4% SO2 will be utilized in the near future.
APTIC-25938

HOW AIR POLLUTION CAN BE CONTROLLED IN A PLANT.

Brick Clay Rec., 151 (3):51-53, Sept. 1967.
R. C. Weedy.
Identifiers: *Design criteria, *Refractories, *Fumes, *Mineral processing, *Control equipment, Dusts, Particle size, Afterburners, Centrifugal separators, Electrostatic precipitators, Scrubbers, Control methods, Combustion.

The establishment of satisfactory fume control in a refractories plant requires that specific information on fume particle size be obtained by light or electron microscope analysis and that the quantity of air from which the sample is taken be metered to provide a loading value. Based on this information, the probable efficiencies of various collectors can be estimated. The efficiency of dry and wet collectors drops sharply as particle size decreases below two micron. Improvement in efficiency can be achieved by a larger pressure drop across the unit or, if applicable, by the electrical charging of particles. Certain plant conditions may indicate some type of thermal or catalytic combustion equipment, the efficiencies of which are generally quite high. Pilot plant trials of any unit are recommended to determine percentage efficiency, operating and maintenance costs, and probable uses for the recovered product.
APTIC-25939

EFFECT OF FILTER MEDIA MICROSTRUCTURE ON DUST COLLECTION.

ASHRAE (Am. Soc. Heating, Refrig. AirCond. Engrs.) J., 5 (4):37-41, April 1964. 3 refs. (Presented at the ASHRAE Semiannual Meeting, New Orleans, La. Jan. 27-29, 1964.)
S. P. Duncan.
Identifiers: *Filter microstructure, *Dusts, *Collectors, Filters.

Photomicrographs are presented to demonstrate the performance of four filter media with several dusts. The media are as follows: (1) a paper made mostly of cotton fiber and with one side much more fuzzy than the other, (2) a fine glass fiber mat, (3) a nonwoven carded cotton web, and (4) a spun glass fiber mat used in some throwaway and

automatic filters. All are made by carefully controlled processes involving many variables and thus producing filter media with microscopic and macroscopic variations. As shown, there are measurable variations in the performance characteristics of resistance, efficiency, and dirt-holding capacity. Filter users should realize that a range exists and that unless additional costly controls and inspection procedures are instituted at the points of media manufacture and filter construction, the spread of these ranges of performance will remain at measurable and, in some cases, significant levels.
APTIC-25960

REMOVAL OF SULFUR FROM FUELS AND PRODUCTS OF COMBUSTION.

Preprint, American Society of Mechanical Engineers, New York, 12p., 1965. 9 refs.
(Presented at the American Society of Mechanical Engineers Winter Annual Meeting, New York, N. Y., Nov. 29-Dec. 4 1964, ASME Publ. 64-WA/APC-2.)
T. T. Frankenberg.
Identifiers: *Costs, *Coal preparation, *So2 removal (combustion products), Electric power production, By-product recovery.

The removal of sulfur from fuels or the elimination of its oxides from flue gases has been under study for a number of years, but none of the methods tried appears likely to be self-supporting in terms of salable by-products in today's markets. Capital costs of all methods are high and some economic benefit is required to minimize losses incurred in complying with air pollution regulations. A number of approaches have been applied to remove pyritic sulfur from coal. They include electrostatic separation, corona discharge, magnetic separation, reduction by bacterial action, coal benefaction, and coal gasification. Little progress has been made in research in any of these areas. Similarly, none of the methods for removing sulfur dioxide from flue gases is far enough advanced to have a clear prospect of economic justification for power plants. Various wet and dry processes are described and evaluated. Of the dry processes, three at least provide the possibility of a salable by-product. These are the alkalized alumina, Reinluft, and catalytic gas-phase oxidation processes. All need further trials and development to determine their economics.
APTIC-25961

PILOT-PLANT INVESTIGATIONS OF THE DESULPHURISATION OF LIGHT DISTILLATES.

Inst. Gas Eng. J. (London), 7 (6):472-489, June 1967. 13 refs.
J. A. Lacey, and S. K. Mukherjee.
Identifiers: *Distillate oils, *Pilot plants, *Hydrodesulfurization, Great britain, Residual oils, Absorption (general), Hydrogen sulfide, Catalytic activity.

Pilot-scale investigations are described of the hydrodesulfurization of light hydrocarbon feedstocks to give a product, containing less than 0.2 ppm (wt) of sulfur that is suitable for catalytic reforming with steam. The feedstock is vaporized at pressure, mixed with hydrogenating gas, and passed over a nickel-molybdenum (Nimox) catalyst at 350 to 400 C to convert the organic sulfur to hydrogen sulfide, which is absorbed in Luxmasse. Hydrogenating gas equivalent in composition either to the rich gas, town gas or lean recycle gas of commercial gas-making plants can be used to purify feedstocks having final boiling-points up to 232 C and sulfur contents up to 1000 ppm (wt). The main variables affecting the purification (temperature, hydrogen partial pressure oil space velocity and hydrogenating gas composition) are investigated. Under selected conditions, there is no difficulty in purifying LDF 115 and LDF 170 containing less than 500 ppm (wt) of sulfur in a single-stage Nimox/Luxmasse process. For LDF 170 containing more than 500 ppm (wt) of sulfur and heavy reformed feedstock, a two-stage process is necessary. Luxmasse is capable of removing hydrogen sulfide quantitatively until it is almost saturated, at which point it contains about 19% (wt) of sulfur. It is thus a cheap and effective absorbent. However, its performance can be adversely affected by the accidental fluctuations of commercial operation, such as over-reduction or excessively high concentrations of carbon oxides or water vapor in the hydrogenating gas. For complete removal of hydrogen sulfide under industrial conditions, a catch of zinc oxide after the Luxmasse beds is entirely effective. (Author summary modified)
APTIC-25962

SMELTERY FUMES--THEIR CONDENSATION AND UTILIZATION.

Colo. Sci. Soc., Proc., vol. 9:65-78, 1908.
Franklin R. Carpenter.
Identifiers: *Primary metallurgical processing, *By-product recovery, *So2 removal (combustion products), Proposals, Fumes, Sulfur trioxide, Sulfur compounds, Hydrogen sulfide, Reduction, Condensation, Freezing.

An appalling amount of sulfur is wasted daily by smelting works. However, no satisfactory method for utilizing sulfur fumes has been derived with the exception of their conversion to sulfuric acid. Because of the costs of rail transportation, the sulfuric acid process is justified only where there is a local or not too distant market for the acid. It is proposed to recover sulfur from the fumes by one or all of the following methods: (1) Separation of sulfur dioxide gas from remaining gases by freezing, and the subsequent recovery of the sulfur by reduction; (2) Passing of all the fumes without separation through a reducing atmosphere and recovering the reduced sulfur by settling or filtering; (3) Conversion of a part of the SO2 to hydrogen sulfide with production of free sulfur by a reaction between SO2 and H2S and (4) Conversion of the whole of the SO2 to H2S, and the production of free sulfur from this by means of Claus-Chance kilns. In a discussion appended to the article, the power expenditure required for refrigeration is calculated. The point is made that sulfur produced as a by-product by the refrigeration method would only pay for the costs of operating the refrigeration unit.
APTIC-25969

PROCEDURE FOR MANUFACTURING SULFUR BY THE REDUCTION OF SULFUROUS ACID.

(Fremgangsmate til fremstilling av svovel ved reduksjon av svovelsyrling). Text in Norwegian.
(Assignee not given.) Norw. Pat. 54,911. 1p., Feb. 25, 1935. (Appl. June 11, 1934, 4 claims).
Axel Rudolf Lindblad.
Identifiers: *Catalysts, *Reduction, *So2 removal (combustion products), Sweden, Combustion gases, Primary metallurgical processing, By-product recovery, Aluminum compounds, Manganese compounds, Aluminum oxides, Carbon monoxide, Sulfur compounds, Temperature.

Sulfur is recovered from gases produced by the roasting of pyrites or other sulfur-containing ores by means of reduction with carbon monoxide in the presence of a catalyst. The main feature of the invention is that this catalyst contains as its active ingredient an aluminate cement containing at least 25% Al203. This can be used by itself or in a mixture with other substances, such as manganese or a manganese compound. Reduction takes place within the temperature range of 350-650 C.
APTIC-25972

METHOD OF MANUFACTURING SULFUR FROM GASES CONTAINING SULFUR DIOXIDE.

(Sistema per la produzione di zolfo da gas contenenti anidride solforosa). Text in Italian.
(Pyrites Co., Ltd., London (England)) Ital. Pat. 380,818. 6p., June 5, 1950. (Appl. Feb. 22, 1940, 9 claims).
Personal Author Not Recorded.
Identifiers: *Catalysts, *Reduction, *So2 removal (combustion products), Great britain, Combustion gases, Dusts, Coal, Coke, Centrifugal separators, By-product recovery, Sulfur compounds, Temperature.

A process is described which is intended for use with gas mixtures containing at least 12% sulfur dioxide and little or no oxygen. The gas is passed over a mass or column containing a carboniferous material. The gas is introduced at the top of the column or mass, and the product is removed from the lower end. Dust is removed from the gas before processing, by passing the gas through a cyclone made of refractory material. The process should be carried out at a temperature of no less then 850 C.
APTIC-25973

METHOD OF MANUFACTURING SULFUR BY THE REDUCTION OF SULFUR DIOXIDE.

(Forfaringssatt vid framstallning av svavel genom reduktion av svavelsyrlighet). Text in Swedish.
(Bolidens Gruvaktiebolag, Stockholm (Sweden))
Swed. Pat. 84,978. 1p., Dec. 3, 1935. (Appl. March 26, 1934, 2 claims).
P. H. W. Agren, and J. H. O. Lindhe.
Identifiers: *Catalysts, *Reduction, *So2 removal (combustion products), Carbon black, Cements, Sweden, Combustion gases, Primary metallurgical processing, By-product recovery, Titanium compounds, Oxides, Sulfur compounds.

The method of manufacturing sulfur by reducing sulfur dioxide is suitable for use with sulfur-laden gases produced by roasting or smelting. The reducing agent is carbon or material containing carbon, with the use of a catalyst, which is specified as a mixture of titanium dioxide or other titanium compound with cement, which could be aluminate cement such as is used in smelting.
APTIC-25974

AIR POLLUTION CAUSED BY AGRICULTURE AND FORESTRY: DUST.

In: Project Clean Air. California Univ., Berkeley, Task Force No. 5, Section 5, 3p., Sept. 1, 1970. 7 refs.
Victor P. Osterli.
Identifiers: *Erosion, *Dusts, *Control methods, Animals, Plants (botany), Respiratory diseases, Farms, Soils, Visibility, Winds, Wetting.

Improved methods, machinery, or chemicals are needed to improve soil stability and reduce wind erosion. Storage, transport, and milling operations produce significant amounts of dust which, if not controlled, reduce visibility and produce respiratory discomfort. Confinement production of farm animals and poultry in dry areas aggravates the dust problem. The use of suitable cover crops will protect fallow land, but much can be gained by developing new strains of plants capable of providing even limited growth and cover on non-cultivated areas. While dust can be effectively controlled by periodic wetting under most soil conditions, concern has been expressed regarding the effect of increased humidity upon animal performance.
APTIC-25976

AIR POLLUTION CAUSED BY AGRICULTURE AND FORESTRY: ODOR.

In: Project Clean Air. California Univ., Berkeley, Task Force No. 5, Section 6, 4p., Sept. 1, 1970. 20 refs.
Victor P. Osterli.
Identifiers: *Food and feed operations, *Rendering, *Odor counteraction, Odors, Kraft pulping, Incineration, Organic wastes, Afterburners, By-product recovery, Pyrolysis, Combustion.

The development of methods to control odor at the site and for disposal of livestock and poultry fecal matter is a major need. One possible process, wet oxidation, could be of real significance since it would not only eliminate the fecal matter but would produce energy to carry out the disposal process and possibly even convert the wastes to animal feed. Treating the manure with chemical deodorants may provide a partial solution. A specific application of the pyrolysis-combustion process could be an alternative to current methods of incineration used which would eliminate or substantially alleviate the problem of malodors. Afterburner-type devices are available for some kinds of rendering plants to control odors. In addition to animal wastes and odors from meat processing and rendering plants, more than 28 million tons of wood pulp are produced yearly in the United States by the sulfate or kraft process which produces a pollution problem.
APTIC-25977

ODOR CONTROL IN FISH AND BONE MEAL FACTORIES IN NORTH EUROPE. (III). (DE LAVAL SYSTEM AND ATV SYSTEM).

(Hoku ni okeru gyochokotsu, jukotsu to shori kojo no dasshu taisaku (sono III) (de rabaru hoshiki to ATV hoshiki ni tsuite)). Text in Japanese. Akushu no Kenkyu (Odor Research J. Japan), 1 (3):54-63, Oct. 1970.
Tatsukichi Ishiguro.
Identifiers: *Food and feed operations, *Odor counteraction, Japan, Boilers, Scrubbers, Design criteria, Combustion, Temperature.

The de Laval system (Swedish) and the ATV system (Danish) for odor control in fish and bone meal factories are discussed, as well as an example in Tokyo. The Swedish system is characterized by being closed with odors collected into one place, minimizing the amount of air which escapes. An adequate balance is maintained between the amount of odor generated, wind, and the amount of water in the scrubbing tower. In the case of fish meal, it is best to combine washing and a combustion method. To prevent corrosion and the lowering of combustion efficiency, a demister and water trap are provided following washing. Also, after heating the gas, some part of it is burnt as secondary air which makes it easier to maintain a constantly high temperature in the furnace. The ATV method is also a closed system. Asbestos plates are arranged in the scrubbing tower, which is equipped with special nozzles. After the air is washed, it is burnt in a boiler at 750-1100 C.
APTIC-26002

TREATMENT OF DUST GENERATED AT IRON MILL.

(Seitetsusho ni hasseisuru dasuto shoriho). Text in Japanese. (Japan Magnetic Ore Screening Co.) Japan. Pat. Sho 43-29863. 3p., Dec. 21, 1968. (Appl. Feb. 1965, claims not given).
G. Harada, S. Yamamoto, K. Osumi, and H. Shimizu.
Identifiers: *Iron, *Dusts, *Primary metallurgical processing, *Control methods, Cements, Japan, Sintering, By-product recovery, Sedimentation, Carbonates, Calcium compounds, Oxides, Drying, Water.

A method is described for recovering oxidized iron by adding cement or plated lime to the fine wet iron dust particulates from the sedimentation tank, thus making it easier to handle. Even after the dust from the sedimentation tank is dehydrated with a filter, it still contains 30% water which prohibits its reuse. However, the dust mixed with cement or lime dries and solidifies naturally, permitting reuse for sintering. Because of the capillary action of the small air spaces between the dust particles as well as the water adhering to their surface, mechanical methods are ineffective. Evaporation by heat is too expensive. Dust from sticky ores and from the stacks of the sintering mill can also be treated by this method, thus conserving useful resources.
APTIC-26003

ON DEVELOPMENT OF DESULFURIZATION TECHNOLOGY: ONE OF MITI'S BIG PROJECTS.

(Ogata purojekuto ni okeru juyu no tei iouka taisaku to kogakuteki shomondai). Text in Japanese. Kagaku Kogaku (Chem. Eng.), 34 (12):1239-1244, Dec. 1970.
Tadao Shiba.
Identifiers: *Research programs, *Japan, *Desulfurization of fuels, Fuel oils.

In 1966, the Agency of Industrial Science and Technology established a desulfurization research subcommittee, MITI, to promote the development of technology for controlling air pollution by sulfur dioxide. From 1967 on, desulfurization of heavy oil has been extensively researched by MITI, which, with nine oil refining companies, is collaborating with the Agency's Chemical Industrial Research Institute to develop a direct desulfurization method. Catalysts for both fixed-bed and suspended-bed processes were studied in 1967 and 1968; since 1969 engineering studies have been conducted at a test plant. Because of budget limitations, only a suspended-bed process has been evaluated, although both fixed-bed and suspended-bed processes should be developed simultaneously. Based on data obtained in these studies, a 500 BPSD test plant is under construction. The government will have proprietary right in any process developed, although the research is made possible only by the cooperation of private enterprise.
APTIC-26005

EBULLATED (SIC) BED H-OIL METHOD.

(Ebullated bed h-oil ho). Text in Japanese. Kagaku Kogaku (Chem. Eng.), 34 (12):1265-1272, Dec. 1970. 11 refs.
Eiichi Tanaka.
Identifiers: *Catalytic activity, *Residual oils, *Petroleum refining, Japan.

The H-oil process for the hydrogen cracking of distilled residual oil at normal or reduced pressure is described, together with the ebullient bed used for the reaction. Both extrudate-type catalysts and fine-type catalysts are practical for the process; the feasibility of microspheroidal catalysts has been studied. One of the characteristics of an ebullient bed is that the catalyst can be added or withdrawn while the bed is in operation, an advantage when a catalyst rapidly becomes inactive. In the H-oil process, it is not necessary to pass normal-pressure heavy oil or reduced-pressure residual oil through a furnace before charging. Thus there is no problem of residual oil coking due to heating. Since the heat exchanger gets dirty, heat recovery by heat exchange is avoided in long-term operations. Although it has wider applications than fixed-bed processes, the ebullient-bed process has not been widely used in Japan. The number of installations should increase, however, following the forthcoming total ban on residual oil.
APTIC-26006

THE EXHAUST EMISSION CONTROL SYSTEM FOR ROTARY ENGINES.

(Rotari engin yo haiki gasu joka sochi). Text in Japanese. Hitachi Hyoron, 52 (12):1126-1131, Dec. 1970. 9 refs.
Yasuo Tatsutomi, Toru Nakagawa, Yukio Hosho, and Yoshishigo Oyama.
Identifiers: *Rotary piston engines, *Automotive emission control, Japan, Engine exhausts, Afterburners, Combustion air, Secondary air, Design criteria, Hydrocarbons, Nitrogen oxides.

A research program to develop an exhaust emission control system for rotary piston engines has resulted in the design of a system which combines air injection with a thermal reactor. Compared with the reciprocating engine, the rotary engine has a relatively wide quench zone. While nitrogen oxide concentrations are low, the amount of hydrocarbons in the exhaust is high. However, the rotary engine burns easily even coarse quality gasolines. An air injection system was adopted to reduce the hydrocarbons, with a thermal reactor to further increase its efficiency. Since the rotary engine requires a large amount of secondary air at idle, the air injection pump must be larger than that of the reciprocating engine, while it also must be small enough to be housed in a not too large space. A pump with a long rotor was designed; meeting the requirements of the United States H.E.W. test, the control system is being exported to the U. S.
APTIC-26008

CHEMICAL STRUCTURES AND ACTIVITIES OF THE HYDRODESULFURIZATION CATALYSTS.

(Suisoka datsuryo shokubai no kago keitai to kassei). Text in Japanese. Nenryo Kyoka shi (J. Fuel Soc. Japan, Tokyo), 49 (523):825-836, Nov. 1970. 52 refs.
Katsuhiko Wakabayashi.
Identifiers: *Catalysts, *Hydrodesulfurization, Japan, Petroleum refining, Hydrocarbons, Cobalt compounds, Molybdenum compounds, Nickel compounds, Sodium compounds, Aluminum oxides, Silicon dioxide, Hydrogen sulfide, Surface properties.

In removing sulfur compounds from liquid petroleum fractions, hydrodesulfurization with solid catalysts produces hydrocarbons and hydrogen sulfide. The d-electron and atomic radius of the catalytic metal plays a part in the desulfurization. Molybdenum, nickel, and cobalt may be used as catalysts, either separately or added to alumina. The most active carrier is silicon dioxide: aluminum oxide: sodium monoxide in a ratio of 9:88:3. Physical structure of the carrier is important to its activity, while catalytic activity is dependent on the method in which the catalysts are put on the carrier. A wet method is said to give the most activity. The Co-Mo-Al203 compound has the most activity when the Co/Mo ratio is 0.25:1.0, while Ni-Mo-Al202 has the most activity when the Ni/Mo ratio is 0.25:1.5. Chemical analysis of the catalysts is difficult due to the complex compounds which are formed. However, the catalysts must have the proper physical and chemical structure for the sulfates to contact their surface.
APTIC-26010

GASIFICATION PROCESS USING ASPHALT AS RAW MATERIAL.

(Asufaruto o genryo toshita gasuka purosesu). Text in Japanese. Kagaku Kogyo (Tokyo), 14 (4):81-85, April 1970. 10 refs.
S. Nojima, and H. Uenoge.
Identifiers: *Gasification (synthesis), *Asphalt, Costs, Japan, Fuel gases, Residual oils, By-product recovery, Hydrogen, Temperature.

In order to solve the problem of an oversupply of asphalt on the economic market, it has been necessary to develop new demands for it. The Shell gasification process of making hydrogen from asphalt for the desulfurization of fuel oil is described. Shell's first plant was opened in 1954 in the Netherlands to effectively use an oversupply of heavy oil in Europe. Various plants are presently in operation for the production of ammonia, methanol, city gas, and hydrogen. Compared with heavy oil, asphalt has a higher melting point and viscosity, so that the temperature in the preheater must be higher. The supply pipe and charging pump must also be kept warm with a jacket. When the price of hydrogen is about $.01/cu Nm, the price of asphalt should be $10.08/t, while the price of naphtha would be $18.20/t. In view of the trend in prices of naphtha and asphalt, partial oxidation of asphalt appears to be a more advantageous method.
APTIC-26011

QUALITATIVE ANALYSES OF ODOR COMPONENTS IN THE PYROLYSIS OF FEATHER IN THE LABORATORY TEST.

(Feza kanetsu shoriji ni hassei suru shuki seibun to sono teisaku—tokuni akurorein no kakunin ni tsuite). Text in Japanese. Akushu no Kenkyu (Odor Research J. Japan), 1 (3):34-44, Oct. 1970. 5 refs.
Y. Hoshika, and T. Ishiguro.
Identifiers: *Pyrolysis, *Rendering, *Odor counteraction, *Feathers, Japan, Odors, Scrubbers, Acetaldehyde, Acrolein, Ammonia, Amines, Mercaptans, Hydrogen sulfide, Condensation.

Feather treatment in the rendering process generates odorous acrolein in amounts of 0.01 to 0.1 ml out of 25 mg of feather. In addition to acrolein, such odorous gases as methyl mercaptan, acetaldehyde, diethylamine, n-propylamine, ammonia, and hydrogen sulfide are also generated. A pyrolysis method should be adopted, and a low temperature condensation method should be applied to eliminate water, or an electrical water elimination method developed, so that the rendering process can be accomplished without heating. If a heating process cannot be applied, use of 2,4-dinitrophenylhydrazine in a scrubbing tower is recommended. The rendering process is explained, and a pyrolysis flow sheet is provided.
APTIC-26014

AUTOMATED DESIGN OF STEEL-FRAME SUPPORTED CHIMNEYS.

For primary bibliographic entry see Field 14.
APTIC-26015

ADJUST SPARK ADVANCE TO CONTROL NOX.

Automotive Eng., 78 (10):53-54, Oct. 1970.
Personal Author Not Recorded.
Identifiers: *Nitrogen oxides, *Fuel evaporation, *Spark advance, *Spark timing, Emission standards, California, Spark ignition engines, Automobiles, Design criteria.

Evaporative emission control systems for 1970 California cars have been modified to eliminate moving parts. The California standards for nitrogen oxides are met by restricting the use of distributor spark advance at low speeds. The various companies accomplish this in differing ways, however. General Motors uses a transmission-controlled spark. Ford and Chrysler use a frequency signal derived from the speedometer cable to trigger a solenoid that closes the distributor vacuum advance line. On most Chevrolet engines, the transmission control spark function is integrated into a new combination emission control valve.
APTIC-26017

CHEMICAL COMPOSITION OF FINELY-DISPERSED DUST FORMED DURING BLOWING OXYGEN THROUGH THE MELT IN THE HEARTH OF A STEEL FURNACE. 1ST COMMUNICATION.

(O khimicheskom sostave melkodispersnoy pyli, obrazuyushcheysya pri produvke kislorodom rasplava v vanne staleplavil'noy pechi. Soobshcheniye 1). Text in Russian. Izv. Vysshikh Uchebn. Zavedenii, Chernaya Met., 13 (9):166-168, 1970. 6 refs.
M. A. Glinkov, and N. M. Morekhina.
Identifiers: *Dusts, *Blast furnaces, *Chemical composition, Steel, Ussr, Stack gases, Primary metallurgical processing, Iron oxides.

A review of available data leads to the conclusion that dust, produced by blowing oxygen through the melt in a blast furnace, contains ferromagnetic gamma-Fe2O3 which, in time, converts to hematite (alpha-Fe2O3). This may be of interest in the development of new methods for removing magnetic particles from exhaust gases by means of a rotating electromagnetic field.
APTIC-26018

TESTING OF AN EXPERIMENTAL INDUSTRIAL ABSORBER WITH MOBILE PACKING.

(Ispytaniya opytnogo promyshlennogo absorbera s podvizhnoy nasadkoy). Text in Russian. Bumazhn. Prom. (Moscow), no. 10:18-19, Oct. 1970. 2 refs.
V. F. Korenevskiy, and G. G. Bratchikov.
Identifiers: *Packed towers, *Absorption (general), Mobile, Ussr, Stack gases, Flow rates.

An industrial absorber utilizing mobile packing, and capable of handling gas flow rates of 3-5 m/sec with a liquid flow of 100-160 cu m/sq m-hr, was 4-5 times more efficient than a comparable bubble tower. Hydraulic resistance of the arrangement described was 1.5-2 times lower than for bubble towers when operated at a gas flow rate of 1.0-1.5 m/sec with an irrigation density of 35-50 cu m/sq m-hr. Good-quality digesting acid can be obtained with three (220-240)-mm absorption layers. The sulfur dioxide content of exhaust gases was reduced from 7.29-10.75 to 0.16-0.78% using this arrangement.
APTIC-26019

PRODUCTION AND COST OF LEADLESS GASOLINE.

(Muen gasorin no seizo rei to sono seizo kosuto). Text in Japanese. Sekiyu Gakkai Shi (J. Japan Petroleum Inst., Tokyo), 13 (11):907-911, Nov. 1970.
T. Kashiwabara, and S. Suzuki.
Identifiers: *Petroleum refining, costs, *Unleaded gasoline, Costs, Japan, Gasolines, Petroleum refining, Hydrogenation.

Processes for producing unleaded gasoline are reviewed, and production costs are considered for plants on the scale of 50,000-25,000 BSD. On the assumption that the gasoline produced will have the same properties as the average U. S. leadless gasoline, the refining process is stated for an elemental oil refinery. To produce gasoline with an octane number of 99.5, the plant would require large amounts of a mixture base with numbers higher than 99.5 if it uses contact cracking gasoline as the raw oil. Features of the process are an isomerizer for increasing the octane number of C5 and C6 fractions, reforming equipment (RON 102), and redistillation of reformed gasoline. For this plant, production of unleaded gasoline would reach 90%. Production costs would increase by 1.23 cents/gal. Another case is considered in which production of the same amount of unleaded gasoline would require hydrogenation cracking of light oil by distillation at reduced pressure.
APTIC-26021

GAS FILTER.

(Gasu seijo sochi). Text in Japanese. (Hitachi, Ltd., Tokyo (Japan)) Japan. Pat. Sho 45-25077. 2p., Aug. 20, 1970. (Appl. Nov. 29, 1965, claims not given).
N. Isahaya.
Identifiers: *Electrostatic precipitators, *Filters, Japan, Combustion gases, Dusts, Smokes, Fuel oils, Residual oils, Particle size, Maintenance, Adsorption (general), Design criteria, Flow rates, Particle growth.

An apparatus is described for removing smoke particles and sulfur oxides from gases produced by the combustion of heavy oil. The apparatus comprises an electrostatic precipitator for promoting the cohesion of dust particles, rotating filter drum for the collection of the cohesive dust and the adsorption of gases, and a jet for cleaning the filter drum. After being charged by corona discharge, the particles flow into the electrostatic precipitator where they form a cohesive mass that in turn flows to the filter drum. The filter is designed to insure small pressure loss and easy maintenance. It can be cleaned by water or inactive gas jetted against the filter in counterflow to gas flow. Smoke particles from heavy oil combustion are almost all less than one micron; after 0.1-0.5 sec passage through the electrostatic precipitator, they adhere to form particles larger than 10 micron. Efficiency of the collector is more than 90% at a gas flow of 20 cm/sec. A part of the purified gas can be utilized in cleaning the filter.
APTIC-26022

SEMINAR ON 'REMOVAL OF GASES AND DUSTS FROM VENTILATING AIR AND INDUSTRIAL EMISSIONS'.

(Seminar 'Ochistka ventilyatsionnogo vozdukha i promyshlennykh vybrosov ot gazov i pyli'). Text in Russian. Vodosnabzh. i Sanit. Tekhn., no. 9:37-38, 1970.
Personal Author Not Recorded.
Identifiers: *Control methods, *Meetings, Technical societies, Ussr, Stack gases, Dusts, Industrial emission sources.

A seminar organized jointly by the Leningrad Home of Scientific-Technical Propaganda, the Leningrad Regional Administration of the Scientific-Technical Society of the Building Industry, and the All-Union Research Institute for the Conservation of Labor, held in Leningrad March 24-26, 1970 is briefly reported. The seminar was attended by 271 representatives from 21 cities, and 41 reports were presented. These reports, together with recommendations drawn up by the seminar, have been published by the Leningrad Home of Scientific-Technical Propaganda.
APTIC-26023

CONCENTRATION/RECOVERY METHOD FOR LOW-DENSITY SULFUR DIOXIDE.

(Tei-nodo aryusangasu no noshuku-kaishuho). Text in Japanese. (Showa Denko Co. (Japan)) Japan. Pat. Sho 45-25763. 6p., Aug. 26, 1970. (Appl. Oct. 6, 1967, claims not given).
Y. Suwa, and M. Shimizu.
Identifiers: *Scrubbers, *Absorption (general), Japan, Combustion gases, By-product recovery, Design criteria, Ammonium compounds, Sulfites, Heat transfer, Density.

A system is described in which waste gases containing low concentrations of sulfur dioxide are washed with an ammonium sulfite aqueous solution. The acidic ammonium sulfite water solution so obtained then is pyrolyzed to yield a high concentration SO2 for recovery. The apparatus comprises two counter-current type gas washing devices. In the first device, untreated waste gases of comparatively high temperature are made to flow counter to the acidic ammonium sulfite water solution introduced from the bottom of the second gas washing device. In the second gas washing device, the waste gases are made to flow counter to an absorbent liquor with a low ammonium sulfite concentration to increase its density. A portion of the high-density acidic ammonium sulfite aqueous solution flowing out from the bottom of the second device is heated and reduced to an ammonia-containing, concentrated SO2, steam, and ammonium sulfite aqueous solution. The gas mixture is cooled for separation and recovery of the high-density SO2, while the absorbent liquor is recovered for recycling.
APTIC-26039

REGENERATION METHOD OF GAS DESULFURIZATION LIQUOR.

(Gasu datsuryueki no saiseiho). Text in Japanese. (Mitsubishi Kakoki Co. (Japan) Japan. Pat. Sho 45-22924. 7p., Aug. 3, 1970. (Appl. July 14, 1964, claims not given).
E. Tanaka, J. Hirata, and A. Yagi.
Identifiers: *Catalytic oxidation, *So2 removal (combustion products), Japan, Stack gases, Packed towers, Sulfur compounds.

In most wet flue-gas desulfurization processes in use today, the desulfurizing liquor is regenerated by employing catalytic oxidation to remove the sulfur contained in the liquor. Removal of the sulfur is incomplete, however, since sulfur so separated is in the form of extremely fine grains. Enough fine grains remain in the liquor to clog the

valves of the regeneration equipment, necessitating periodic shut down for cleaning and lowering desulfurizing efficiency. The present invention provides a regeneration liquor adjustment tank and an aggregation tank to insure that sulfur grains remaining in the liquor are completely arrested and removed during circulation of the liquor. After the used liquor and oxidizing agent (air or oxygen) are injected into the regeneration tower, the liquor overflowing from the tower is led to the adjustment tank equipped with a drift sulfur collector at its top and a precipitated sulfur collector at its bottom. Liquor leaving this tank is then passed to the aggregation tank which is packed with manganese, nickel, zinc, or aluminum compounds and to which air or oxygen is admitted. The metal compounds and the air or oxygen combine to assure final, complete desulfurization of the regenerated liquor.
APTIC-26046

THE REMOVALS FOR THE STINKING COMPOUNDS BY SPRAYING THE DEODORANT SOLUTIONS. (1).

(Dasshuzai ni yoru shinyo shuki seibun no jokyo ni tsuite (1)). Text in Japanese. Akushu No Kenkyu (Odor Research J. Japan), 1 (3):21-28, Oct. 1970. 23 refs.
K. Nishida.
Identifiers: *Odor counteraction, Japan, Odors.

In Japan, complaints about odors are third only to complaints about air pollution and noise and in 1968 reached 19.4% of the total complaints involving these three categories of public nuisances. Although the Pollution Countermeasure Fundamental Law of 1967 clearly defined odor as a pollutant, little advance has been made in the measurement and evaluation of odors. As a result, there is no possibility of odors coming under legal control in the near future. Most of the complaints center on the collection and treatment of human excrement in cities without sewer systems, in particular on the trucks using vacuum suction hoses. Commercial deodorants are available for neutralizing and masking odors in the home and, to a lesser extent, in industry. The use of a spray deodorant containing chlorophyll for eliminating odors from the vacuum trucks was studied. Adsorbents such as activated charcoal and resins are ineffective in these cases since they rapidly become coated with water and with oil from the suction pump. As determined by gas chromatography, the chlorophyll deodorant did not completely eliminate methylamine though it effectively neutralized its odor. Fifteen peaks in the chromatogram for untreated gas were not detected in the chromatogram for treated gas, which indicated a 100% elimination. On the other hand, the post-treatment chromatogram showed 11 new peaks attributable to components of the deodorant.
APTIC-26056

RESEARCH ON ODOR CONTROL IN THE U.S.A. (A CHAPTER OF RENDERING PLANTS IN WEST COAST).

For primary bibliographic entry see Field 12.
APTIC-26057

ELIMINATION OF POLLUTION CAUSED BY FOUNDRY WORKS.

(Imono kojo kara kogai o nakusu tameni). Text in Japanese. Kinzoku (Metals) (Tokyo), 41 (1):131-134, Jan. 1 and 15, 1971.
T. Ishino.
Identifiers: *Dusts, *Cupolas, *Collectors, *Process modification, Japan, Primary metallurgical processing, Electrostatic precipitators, Bag filters.

Cupolas can be the source of many types of pollution. Dust in cupola gas contains particles as large as 70 micron but also a great number of particles as fine as 4-40 micron. These particles are difficult to trap with simple collectors, ordinary dry and wet collectors having efficiencies of only 30 and 40%, respectively. Mold breaking operations at large foundries generate less dust than they do at smaller installations, but at the former the process is continuous. Therefore, workers are exposed to higher dust concentrations for longer periods. By charging only relatively clean materials in the furnace and using water sprays at the top of the cupola, dust can be reduced to less than two g/cu m. Further reduction requires that exhaust gas be cooled and filtered in a bag filter. In this way, about 95% of the dust is trapped. For still higher efficiencies, electric dust collectors must be used. The solution to foundry problems also requires drastic changes in procedures and processes. Foundries should not use foundry changes in procedures and processes. Foundries should not use foundry sand for molds and should eliminate processes such as shaking and ramming. They should consider the use of high-pressure molding machines and low-frequency furnaces for melting and the centralization of all pollutant-generating equipment.
APTIC-26058

ELECTRIC FILTERS FOR DRY AND WET SEPARATION.

(Elektrofilter fuer Trocken- und Nassabscheidung). Text in German. Wasser Luft Betrieb, 14 (1):456-460, Nov. 1970.
Ferdinand Rathgeber.
Identifiers: *Dusts, *Electrostatic precipitators, Germany, Stack gases, Aerosols, Soot, Fuel gases, Electric power production, Incineration, Multiple chamber incinerators, Kilns, Metal fabricating and finishing, Mineral processing, Primary metallurgical processing, Filters, Wet cyclones, By-product recovery.

Recent improvements of electric filters deal with increasing operating reliability, with increasing capacity, with prolonging the life of the equipment, and with adapting the equipment to properties of different dusts. As a result, various modifications of sparking and of precipitation electrodes were produced. In some areas, a combination of electric filtration with other dust removal methods was found advantageous. The trend is towards the building of compact units. Another improvement consists of the introduction of unbreakable electrodes. Wet electric filters have not found as wide application as dry filters. A newly developed wet filter consists of a battery of identical wet elements intended for the separation of aerosols, of dust, of soot, and for the recovery of valuable waste gas components. Examples of the application of improved dry and wet electric filters include dust separation of power plant flue gases and of larger incinerator flue gases which sometimes must be cooled prior to dust removal, dust separation in cement manufacture, gas purification in non ferrous metal smelting plants, the recovery of valuable materials from waste gases from metallurgical processes, and dust removal in the iron and steel industry.
APTIC-26063

REMOVAL OF LEAD FROM AUTOMOBILE EXHAUSTS BY MOLTEN SALTS.

Environ. Sci. Technol., 5 (1):72-74, Jan. 1971. 6 refs.
Sheng-I Cheng, Harris Pitlick, and Robert Siegel.
Identifiers: *Molten salts, *Automotive emission control, *Lead compounds, Automotive emissions, Operating variables, Automobiles, Scrubbers, Adsorption, Cyanates, Potassium compounds, Nitrates, Liquids, Reaction mechanisms, Electrical properties, Temperature.

Since molten salts are fluid and have low vapor pressures at elevated temperatures, they are logical scrubbing agents for the removal of particulates where the cooling of polluted gases is not permitted and the use of water or aqueous solutions for scrubbing is not adequate. An exploratory study was made on the removal of lead particulates from automobile exhausts by means of molten salts. Potassium thiocyanate and potassium nitrate were used to investigate variables of screen size and salt temperature. The efficiency of lead removal increased with the temperature of scrubbing and decreased with the screen-hole size. Although concrete conclusions with regard to the optimum operating conditions of the process cannot be made because of limited data, it is apparent that molten salts have some ability to remove lead particulates from automobile exhausts. Since particles at high velocities and temperatures usually possess some electrical charges, the lead particulates in automobile exhausts may also have charges. When gases containing charged particles are bubbling through molten salts which have relatively high conductances, they may polarize the salt melt. Electrical charges opposite to these particulate matters tend to gather at the vicinity of gas bubbles and an electrical field is built around them. The speedup of the movement of lead particulates toward molten salts under the influence of a force field might be the reason for the increase in collection efficiency. (Author abstract modified)
APTIC-26064

TRICKLING PACKED BED REACTORS.

(Kanekigata hanno sochi). Text in Japanese. Kagaku Kogaku (Chem. Eng.), 34 (12):1260-1265, Dec. 1970. 17 refs.
Noriaki Wakako, and Kozo Egi.
Identifiers: *Residual oils, *Operating variables, *Fuel oil preparation, Corrosion, Japan, Fuel oils, Petroleum refining, Hydrogen sulfide, Catalysis, Pressure, Temperature.

In the direct desulfurization of heavy oil, a 'trickling' packed-bed reactor permits the side-by-side flow of distilled residual oil and hydrogen to the catalyst bed (350-430 C and 50-200 kg/sq cm) and achieves hydrogen cracking of sulfur compounds in the oil. Two Japanese refineries are producing a total of 85,000 barrels of oil/day by tl. Isomax process; a third refinery is producing 25,000 barrels/day by the Gulf Oil process. Problems remaining to be solved include the characteristics of gas and liquid under high temperature and pressure, the manner of contact between gases, liquids, and solids, the way in which hydrogen is dissolved in the liquid, and the reaction taking place within catalyst particulates. The corrosion of equipment by gases, especially hydrogen sulfide, under high temperature and pressure is another problem. Therefore, a method of operation which minimizes mixing of liquids in large-scale equipment is desirable, as are studies that will lead to estimates of mixing under reaction conditions.
APTIC-26065

GULF METHOD.

(Gulf ho). Text in Japanese. Kagaku Kogaku (Chem. Eng.), 34 (12):1257-1260, Dec. 1970.
Yukio Kasahara.
Identifiers: *Residual oils, *Pilot plants, *Fuel oil preparation, Japan, Petroleum refining, Operating variables, Catalysts, Temperature.

Gulf Oil Company's desulfurization process for residual fuel oil is described. Based on 30 years of research and development, the process was evaluated in pilot-plant operations involving tests of 200 ml catalysts. Two plants were designed to operate 6 months and 12 months, respectively. Reactors were operated at 343-455 C, 35-200 kg/sq cm G, and 0.3-3.0 velocity. The material used was 50% Kuwait (*) normal pressure residual oil. The relationship between the life of the catalysts and the temperature required to maintain the sulfur content of the oil at 1% is shown. The actual period of operation of the pilot plants was 7 months and 13.5 months, respectively. At the latter plant, the catalysts were effective at the same temperature for periods as long as four months. At the first Japanese installation to use the Gulf process, two lines of reactors can be operated simultaneously or separately. Catalysts are replaced after 6 months. Particulates are eliminated before the crude oil enters a reactor, and recycled gas is cleaned to eliminate hydrogen sulfide. Effective catalyst tem-

perature is a little lower than that indicated in Gulf's pilot studies. Materials have been carefully selected to avoid corrosion of the air fin cooler and dirtying of equipment.
APTIC-26066

AIR POLLUTION.

Chem. Process., 16 (11):11, 13, Dec. 1970. 7 refs.
Personal Author Not Recorded.
Identifiers: *Control methods, *Nitrogen oxides, Acid smuts, Stack gases, Chemical processing, Flame afterburners, Absorption, Adsorption, Process modification, Excess air, Nitric acid, Nitrogen dioxide (no2), Catalysis.

Nitric acid manufacture, nitrogen processes, and dissolving operations using nitric acid contribute the major portion of oxides of nitrogen emitted to the atmosphere by non-combustion processing. Several methods which exist for the control of these oxides from stack gases include catalysis, adsorption, absorption, and direct flame incineration. Palladium on a particulate alumina support and a ceramic catalyst are recommended for nitric acid tail gas purification. Adsorption on molecular sieves appears economically attractive where high oxygen concentrations preclude non-selective catalysis. Absorption in liquids, while technically feasible, usually introduces by-product disposal problems. Direct flame incineration is most effective for reduction of nitrogen dioxide to nitric oxide. Modifications for combustion processes include low excess air, staged combustion, flue gas recirculation, steam and water injection, combustion with oxygen, and fluidized bed combustion.
APTIC-26071

STUDY ON THE WET-TYPE COLLECTOR USED ON THE PROCESS FOR THE PRODUCTION OF SLAKED LIME.

(Shosekkai seizo kotei ni okeru shisshiki shujin sochi). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 6 (12):61-65, Dec. 1970.
Katsuro Okamura.
Identifiers: *Dusts, *Mineral processing, *Venturi scrubbers, Limestone, Japan, Collectors, Settling chambers, Gravity settling, Hydroxides, Calcium compounds, Oxides.

A multi-unit venturi collector for dust generated in the production of slaked lime is described. The collector is square, with two of its four sides parallel to each other. This design has the advantage of reduced size combined with extended wall surfaces; it promotes the contact of dust particles with wall surfaces while simplifying inspection and maintenance. In the production of slaked lime, a large volume of steam and powder dust is generated in the digestor, where quicklime is added to water. The steam and powder dust (CaO, Ca (OH)2), together with secondary air, are led into the multi-venturi collector where they hit the water drops, are cooled simultaneously, and increase in size. They are then led into a gravity sedimentation chamber for complete separation and reduction to a lime emulsion, part of which is recirculated in the collector and part of which is fed back to the digestor. The collector has a high efficiency for lime dusts, does not discharge any polluted wastewater, and has a minimum pressure loss, even at high air velocities.
APTIC-26072

SIMULTANEOUS SO2 AND FLY ASH REMOVAL.

Environ. Sci. Technol., 5 (1):18-19, Jan. 1971.
Personal Author Not Recorded.
Identifiers: *Fly ash, *Filters, *Alkalized alumina (adsorption), Costs, Stack gases, Particle growth.

With a synthetic sorbent alkalized alumina, the use of granular bed devices makes it possible to remove simultaneously both fly ash and sulfur dioxide form flue gases. Many granular bed designs are shaft filters or panel filters, usually one of three varieties: crossflow shaft-falling solid design, intermittent moving-bed type of design, and the fixed-bed granular filter. The Dorfan Impingo Filter is an example of the first design, and has been used in the collection of dust generated during the drying of asbestos rock with a reported efficiency for 97 to 100%. The falling particles, contained in two separate filtering shafts, are contacted by a crossflow stream of gas. The Squires designs consist of two panel filter concepts in which the accumulated fly ash is removed periodically through the gas entry louvers. Problems of agglomeration and cost estimates are mentioned.
APTIC-26073

AN EXAMPLE OF FORMALDEHYDE GAS CONTROL PROJECT.

(Horumuarudehido o fukumu haiki shori no keikaku kara jisshi made). Text in Japanese. Akushu no Kenkyu (Odor Research J. Japan), 1 (3):29-33, Oct. 1970.
Toshio Suzuki, and Syuichi Sakamoto.
Identifiers: *Rubber manufacturing, *Packed towers, *Formaldehydes, Synthetic rubber, Japan, Stack gases, Odors, Dusts, Mists, Drying.

Attempts to reduce formaldehyde emissions from the dryer of a plant manufacturing amino resin molding material, friction material, and polyurethane foam rubber are described. Most of the gas is emitted from the amino resin molding process, about 1.5% from urea resin, and about 2.0% from melamine. A reduction to 0.1 ppm or less of formaldehyde was desired. Scrubbing the gas with water in a tower 30 m high and 3000 mm wide and packed with polypropylene terallet (*) has reduced inlet concentrations from 400 to 20 ppm, and ground level concentrations to 0.03 ppm. A maximum of 500 cu m/min gas, with an inlet temperature of 60 C, can be treated. About 1000 tons of water a day are used. A flange is provided at the top of the tower to trap mist. Although the device is equipped with a pre-washing process, dust in exhaust gas cannot be completely eliminated. In addition, the pressure loss of the tower is increasing, required periodical checks.
APTIC-26074

PROSPECTS FOR ELECTRIC VEHICLES. A STUDY OF LOW-POLLUTION-POTENTIAL VEHICLES--ELECTRIC.

NAPCA Contract PH 86-67-108, NAPCA Pub-APTD 69-52, 96p., Oct. 1969. 9 refs. NTIS: PB 194814
Personal Author Not Recorded.
Identifiers: *Storage batteries, Costs, Feasibility studies, Operating variables, Fuel cells, Automobiles, Buses, Trucks, Design criteria, Lithium compounds, Sodium compounds, Voltage.

A study was undertaken to assess the state of the art in the technologies on which the future development of electric highway vehicles depends. Vehicle specifications have been developed, power and energy calculations made, and electric transmission parameters established for six classes of vehicles. These include the family car, commuter car, utility car, delivery van, city taxi, and city bus. A discussion of the electric transmission system includes reference to motors, controls, speed reducers, and cooling requirements. Direct-current traction motors, alternating-current induction motors, and synchronous motors are mentioned, as well as a chopper for control of the direct-current motor, an inverter for the induction motor, and the static commutator for the synchronous motor. Electrochemical power sources include the lead-acid battery, nickel-cadmium battery, nickel-iron battery, silver batteries, high-temperature alkali metal batteries, alkali metal batteries with organic electrolytes, metal-air batteries, fuel cells, and electrochemical hybrids. Mechanical-electrical hybrids are discussed, as well as cost and refueling requirements for electric vehicles. For the electric vehicle to achieve performance broadly comparable to that of today's internal combustion engine, a low-cost, high-temperature alkali metal battery must be developed. Of the alkali metals, only lithium and sodium are serious candidates.
APTIC-26083

NEW CUMBERLAND, WEST VIRGINIA -- KNOX TOWNSHIP, OHIO -- AIR POLLUTION ABATEMENT ACTIVITY.

For primary bibliographic entry see Field 04.
APTIC-26087

FIBER MIST ELIMINATORS FOR HIGHER VELOCITIES.

Chem. Eng. Progr., 60 (11):68-73, Nov. 1964. 8 refs.
J. A. Brink Jr., W. F. Burggrabe, and J. A. Rauscher.
Identifiers: *Mists, *Glass fabrics, Particle size, Design criteria, Phosphoric acid, Sulfuric acid.

Fiber mist eliminators are now installed in various chemical processes for air pollution control and gas purification. The design superficial velocity of the gas through the fibers in most of the eliminators has been 5 to 30 ft/min. Now, as a result of extensive testing, eliminators are available with superficial velocities of 30 to 90 ft/min, or even higher. These new units are smaller and less expensive than previous designs. Performance data is presented for high-velocity units on sulfuric acid and phosphoric acid mist. At a large-scale sulfuric acid plant, collection efficiencies as high as 96% are obtained for particles three microns and smaller, and pressure drop is constant at 7.5 to 8.0 in. of water. The efficiency of the unit does decrease on small submicron particles when oleum is produced.
APTIC-26095

COMBUSTION EMISSION GAS DISPOSAL METHOD.

(Nensho haigasu shorihobo). Text in Japanese. (Hitachi, Ltd., Tokyo (Japan)) Japan. Pat. Sho 45-22925. 4p., Aug. 3, 1970. (Appl. Aug. 6, 1965, claims not given).
Z. Tamura.
Identifiers: *Adsorption (general), Charcoal, Japan, Stack gases, Dusts, Boilers, Coke, Furnaces, Hydrogen sulfide, Heat transfer.

A process is described that permits the continuous and efficient desulfurization of gases emitted from boilers and furnaces. Exhaust gas is led to a high-temperature air pre-heater and then to a dust collector where carbonic grains or dust are removed. Next, the gas is passed to an adsorption-separation unit comprising three chambers: a high-temperature adsorption chamber, a low-temperature adsorption chamber, and a high-temperature separation chamber. All three chambers are filled with activated charcoal or semi-coke for the adsorption of sulfur dioxide or hydrogen sulfide. After the two-stage adsorption process, the desulfurized gas goes to a low-temperature heat exchanger from which it is discharged to the atmosphere. Heated inert gas (such as nitrogen) is introduced into the separation chamber to effect the separation of the adsorbed sulfurous or sulfuric acid gas from the adsorbent. The gas so separated is led to a deoxidation device for further processing.
APTIC-26104

DISPOSAL METHOD OF SULFUR OXIDE (SO2, SO3)-CONTAINING GAS.

(Ryusan iwo ganyu no shorinoho). Text in Japanese. (Mitsubishi Heavy Industries, Ltd., Tokyo (Japan)) Japan. Pat. Sho 45-23821. 4p., Aug. 10, 1970. (Appl. March 24, 1965, claims not given).
M. Atsukawa, K. Nishitoto, and K. Matsumoto.
Identifiers: *By-product recovery, *Manganese dioxide (japanese), Japan, Stack gases, Ammonium compounds, Ammonia, Manganese compounds, Oxides, Sulfates.

Conventional dry desulfurization processes for waste gas invariably have a temperature limit and use adsorbing or absorbing agents that are either expensive or difficult to regenerate. A new process is described which regenerates the adsorbing agent quickly and effectively, while producing as a by-product a high-purity ammonium sulfate solution. Sulfur oxides in the waste gas are first reduced to manganese sulfate by contacting the gas with solid active water-containing manganese oxide. The manganese sulfate obtained is dissolved in water or a sulfate-containing water solution, and the solution regenerated by the addition of ammonia and oxidation with oxygen or an oxygen-containing gas. At oxidation temperatures higher than 25 C but lower than 45 C, the active manganese oxide is recovered within one or two hours.
APTIC-26105

TECHNOLOGY OF POLLUTION-CONTROL IN ZINC AND LEAD SMELTING.

For primary bibliographic entry see Field 01.
APTIC-26107

TRIAL MODEL OF DUST ELIMINATION DEVICE FOR IRON FOUNDRY CUPOLA.

(Kyuporayo jojin sochi no shisaku). Text in Japanese. Kinzoku (Metals) (Tokyo), 41 (1):135-138, Jan. 1 and 15, 1971. 10 refs.
K. Komatsu, and K. Ueda.
Identifiers: *Dusts, *Cupolas, *Water injection, Iron, Japan, Primary metallurgical processing, Water.

The composition and control of cupola dust is discussed. Although the dust composition varies with the type of scrap metal and coal charged in the furnace, 45% of the dust is silica and more than 50% is 48-150 mesh in size. The amount of dust from one cupola ranges from 4.6-10.2 kg/ton of melted iron, averaging 7.2%. Dust prevention methods are based on falling, inertia, centrifugal action, wet cleaning, filtering, and electrostatic precipitation. A new method of introducing cleaning water into the cupola is described that uses a jet injection valve. With valves there is no problem of uneven distribution of water drops as there is with shower-type ejectors, due to clogging of holes. The water should be injected at 70-120 l/min. At 70 l/min, the temperature of the gas emitted form the cupola is 300-350 C; at 120 l/min, it is 80-150 C.
APTIC-26108

ACID SMUT EMISSION PROBLEMS STUDIED.

Brit. Clayworker, vol. 79: 20-23, 40, 1970.
E. M. Brown.
Identifiers: *Acid smuts, *Kilns, Great britain, Stack gases, Fuel oils, Alkaline additives, Sulfuric acid.

The use of liquid fuels containing up to 3.5% sulfur has accentuated the difficulties associated with smut deposition in continuous kilns, especially transverse-arch kilns. Smut formation, which is defined as the agglomeration of solid particles into large particles, is not resolved by admitting oxygen with the oil or by substituting propane for heavy fuel oil in the forward kiln chambers. Similarly, experiments involving controlled injection of finely powdered alkali into the waste gas stream did not reduce the solid emissions problem, even though the additive neutralized stoichiometrically the sulfuric acid formed in the kiln system. Whether the smuts are acidic or not, a sufficiently high solid concentration may yet exist and result in complaints from local residents or sensitive industries. The only possible chance of alleviating the problem is to have two divided streams, that is, the true flue gases rejected from the kiln in its flue system and the moisture-laden drying air rejected in a completely separate flue system. Only when the gas stream is separated from the air stream can additives have a real hope of success.
APTIC-26118

SULFUR OXIDES BY OIL-FIRING.

(Juyu nenshoh hai gas chu no ioh sankabootsoo ni tsooite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4 (1):77, 1969.
(Proceedings of the Japan Society of Air Pollution Annual Meeting, 10th, 1969.)
K. Takamiya, and Y. Kawauchi.
Identifiers: *Fuel oils, *Firing methods, *Fuel oil preparation, Japan, Distillate oils, Residual oils, Kerosene, Nitrogen, Thiophene.

A study of sulfur oxides generated by heavy oil firing is presented. Heavy oil consists of sulfur compounds of higher molecular weight, such as benzothiophene, and oil of lower distillate, such as kerosene, or heavy oil including less sulfur. When firing it as atomization, portions of lower distillate including mainly carbon and hydrogen may fire first and then higher distillates involving mainly sulfur and nitrogen follow. However, the mechanism in which sulfur dioxide and trioxide are formed has not been clarified. When observing the thermal change of benzothiophene as a representative of sulfur compounds in heavy oil, the addition of nitrogen compounds promotes its change and produces non-combustible compounds. Firing benzothiophene with a little amount of nitrogen compounds with the sulfur dioxide measured by means of flask combustion method, the amount of sulfur dioxide generated has decreased. In the case of heavy oil firing, similar effects are observed. Finally, this method has decreased the amount of sulfur dioxide and trioxide by 15 to 20% and 50 to 80%, respectively, in the case of waste gas from plant boilers.
APTIC-26119

DESULFURIZATION PROCESS IN WHOLE INDUSTRIES (II).

(Datsuryu purosesu no subete (II)). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 6 (12):9-15, Dec. 1970.
Mikio Harima.
Identifiers: *Petroleum refining, *Hydrodesulfurization, Japan, Stack gases, Fuel oils, Distillate oils, Residual oils, By-product recovery, Adsorption (general), Hydrogen sulfide, Hydrogenation.

Desulfurization processes are reviewed with special emphasis on past and present processes used by the petroleum refining industry. Processes for treating petroleum distillate have ranged from washing with sulfuric acid or caustic soda, through sweetening, to hydrogenation and hydrodesulfurization. Various hydrodesulfurization processes are available for light oil, kerosene or diesel oil, and naphtha. Except for the catalyst, the processes are very similar. Much remains to be done before desulfurization of heavy oil is economically or technically feasible. In hydrodesulfurization, sulfur is separated from oil as hydrogen sulfide gas, i.e, 'sour gas.' The gas is first treated in a unit of the separation equipment and then in an absorption column. A variety of gas desulfurization processes are also available, among them the potassium carbonate and vacuum carbonate methods. These are wet methods using adsorption and regeneration columns. Sulfur is recovered from the hydrogen sulfide obtained by wet methods through means of a device that makes use of the Claus device. With the advent of stringent sulfur dioxide controls, incineration of waste gases from sulfur recovery units is being abandoned in favor of new methods. These include the Wellman, Beavon, and IFP processes.
APTIC-26124

REFUSE TREATMENT BY COMPRESSION.

(Assaku kokaho ni yoru gomi shori ni tsuite). Text in Japanese. Kogai to Taisaku (J. Pollution Control), 6 (12):973-979, Dec. 1970.
Fushito Suzuki.
Identifiers: *Solid waste disposal, *Compression, Asphalt, Surface coatings, Japan, Sewage, Odor counteraction, Liquids, Operating variables.

A compression system for the disposal of city and industrial refuse was developed, able to handle 50 tons of waste in an eight hour day. Consisting of sundry trash (38%), excrements (21%), synthetic resins (6%), incombustible refuse (10%), and others (25%), the gathered refuse is pressed by a preliminary and a main compression press, then covered with wire mesh to be dipped in an asphalt melt for coating. This process is carried out automatically and the resultant product, named 'Tekkaishi', is produced in about 8 minutes and weighs 850-900 kg. An air curtain shuts off the foul smell from the refuse, while the odor from the asphalt melt is improved with deodorization equipment. The water compressed out of the refuse is treated by oxidation for the removal of organic matter and is discharged. Waste water is screened to be accumulated with activated sludge and is purified in sedimentation tanks. Problems connected with the adoption of an asphalt method concern the high temperatures of operation, foul odors, and the life of the melting furnace. Pollution by the 'Tekkaishi' buried in the earth has not been observed.
APTIC-26125

REACTIVITY OF FERRIC OXYHYDROXIDE TO SULFUR DIOXIDE.

(Gansui sankatetsu no nisanka iou ni taisuru kassei). Text in Japanese. Nippon Kagaku Zasshi (J. Chem. Soc. Japan), 91 (10):935-940, Oct. 1970. 15 refs.
Tatsuo Ishikawa, and Katsuya Inoue.
Identifiers: *Hydroxides, *Iron oxides, *Adsorption (general), Japan, Combustion gases, Reaction kinetics, Crystal structure, Surface properties.

The relation between the ability of ferric oxyhydroxide to adsorb sulfur dioxide gas and its properties was investigated. Seven kinds of ferric oxyhydroxides were prepared, and their properties determined by X-ray diffraction, infrared analysis, differential thermal analysis, and electron microscopy. Variations in crystal structure, size, and shape and surface area were observed. Analysis of gravimetric measurements of SO2 adsorption by alpha, beta, and gamma types of ferric oxyhydroxide showed that adsorption equilibrium was achieved within one hour for all samples. Adsorption isothermal lines were the BET type for alpha and gamma samples and the Langmuir type for beta samples. The dissociation line of SO2 agreed with the adsorption line in the low-pressure region but differed slightly in the high-pressure region. The difference is attributed to the first layer of molecules. Adsorption surface area, as estimated from adsorption isothermal lines, agreed well with surface areas calculated from experimental data on nitrogen adsorption. The surface property of a ferric oxyhydroxide is determined mainly by crystal structure, not by crystal size or shape. All samples investigated chemically adsorbed SO2, in particular the beta samples. In many cases, the reaction between ferric oxyhydroxide and SO2 was second order. Of all crystal structures considered, the beta had the highest reaction rate and the lowest activating energy. These findings demonstrate that beta ferric oxyhydroxides have the greatest reactivity for SO2.
APTIC-26126

DEODORIZING EQUIPMENT AND DEODORANTS.

(Dasshu sochi oyobi dasshuzai). Text in Japanese. Kogai (Hakua Shobo) (Pollution Control), 5 (2):62-81, March 1970. 3 refs.
Y. Baba.
Identifiers: *Commercial equipment, *Odor counteraction, Commercial firms, Costs, Japan, Odors, Chemical processing, Food and feed operations, Rendering, Afterburners, Adsorption, Catalytic oxidation, Hydrogen sulfide, Oxidation, Combustion.

Of the 5986 complaints received by 30 prefectural governments in 1967, 1232, or 20.6%, concerned odors. Sixty-five percent of the odors originated in agricultural and livestock operations and 45% in industrial processes, mainly those of chemical and

food industries. As determined by a survey of 3000 enterprises, the most commonly used deodorizing method is gas cleaning. The principles on which a number of odor control methods are based are described together with areas of application and equipment used. Major equipment manufacturers are noted, as are operating costs of the methods. The methods include ozone oxidation, catalytic combustion, adsorption, chlorine treatment, air oxidation, combustion, and use of chemical deodorants. Ozone oxidation is mainly used to eliminate odors of human excrement; its operating cost is low. Catalytic combustion has wide application, and its operating cost is lower than that of the heat tube method. Depending on application, gas cleaning methods vary greatly in scale, type, and materials. The adsorption method is applicable to rendering plants and food processing plants. Air oxidation is used to treat effluent containing hydrogen sulfide, and direct combustion by oil and fat industries. Thirty seven deodorants are described.
APTIC-26128

THE DISTRIBUTION OF CARBON, VANADIUM AND NICKEL DEPOSITS ON CATALYST LAYER DURING HYDRODESULFURIZATION PROCESSES OF PETROLEUM RESIDUM.

(Tansoshitsu, banajumu oyobi nikkeru no datsuryu shokubaiso eno taiseki bunpu). Text in Japanese. Kogai (Hakua Shobo) (Pollution Control), 5 (2):61-71, March 1970. 15 refs.
Mitsuo Sato, Takao Kwan, Yoshikazu Shimizu, Keiichi Inoue, and Yutaka Koenuma.
Identifiers: *Deposition, *Hydrodesulfurization, *Catalysts, Carbon black, Japan, Fuel oils, Residual oils, Metal compounds, Nickel compounds, Vanadium compounds, Catalytic activity.

Hydrodesulfurization of Khafji petroleum was investigated with special attention to the relation between catalyst durability and the distribution of carbonaceous vanadium, and nickel deposits on the catalyst layer. A cobalt-molybdenum sample was placed in a stainless steel reaction tube, and hydrodesulfurization was performed, at 400 C or below, for 50 hrs and 1000 hrs, respectively. After desulfurization, samples of the catalyst were taken from the inlet, center, and outlet of the catalyst bed and analyzed for deposited carbon, vanadium, and nickel. Elementary analysis, atomic absorption spectrophotometry, and electron spin resonance were employed. Carbonaceous residue increased from 8% at the catalyst be inlet to 11% at the outlet. The spin density of carbon deposit increased to a much greater extent from inlet to outlet. The amount of carbon deposited did not vary significantly with time, suggesting the carbon deposition approaches a steady state within 50-hr processing. Vanadium and nickel deposits decreased from inlet to outlet. Moreover, the amount of metal deposited increased with increasing reaction time. These results indicate that catalyst activity over short periods of time is determined by carbonaceous residue and over long periods of time by metal deposition.
APTIC-26129

ON HYDROCRACKING DESULFURIZATION CATALYST FOR RESIDUAL OIL.

(Zansayu no chokusetsu suisoka datsuryu shokubai ni tsuite). Text in Japanese. Kagaku Kogaku (Chem. Eng.), 34 (12):1244-1251, Dec. 1970. 24 refs.
Masao Inoguchi.
Identifiers: *Residual oils, *Fuel oil preparation, *Catalysts, Japan, Petroleum refining, Catalytic activity.

When residual oil is distilled at normal pressure, more than 80% of the sulfur in the crude oil is retained. Catalysts for hydrocracking desulfurization must be unaffected by heavy metals and asphaltene in oil, must not require too much hydrogen, have selectivity for long-range desulfurization alone, and cost little. Among hydrocracking processes in use in Japan are the RCD Isomax process, the Gulf HDS process, and the H-Oil process. Japanese refineries are also collaborating in the development of a direct desulfurization method for heavy oil. Progress made in this program is described together with the composition of the catalysts used, their method of manufacture, and physical characteristics. Manufacture of a catalyst is improved by the method of instantly sedimenting solutions together. The most active catalysts are those with a major distribution in 5000 A diameter porosity. The porosity distribution of a new catalyst and one in operation for 100 hours differs greatly; between 100 hours and 1000 hours, there is not much difference in distribution. The longest-lasting catalysts are those with the widest average diameter; catalyst activity is lost when accumulations (vanadium, nickel, carbon, etc.) reach 65% of the new catalyst. A catalyst developed and tested in Japan lasted 16-22 bbl/lb in contrast to the 15 bbl/lb (about 6 months) for the Gulf HDC catalyst.
APTIC-26132

ON UOP RCD ISOMAX METHOD.

(UOP RCD aisomakkusuho ni tsuite). Text in Japanese. Kagaku Kogaku (Chem. Eng.), 34 (12):1251-1257, Dec. 1970.
Haruo Yoshioka, and Shigeaki Suzuki.
Identifiers: *Residual oils, *Fuel oil preparation, *Catalysts, Japan, Petroleum refining, By-product recovery, Metal compounds, Hydrogen sulfide.

The Isomax method of desulfurizing reduced crude oil is described; there were four Isomax plants in Japan by the end of 1969. The catalyst used for this process, which is an amalgamation of the Lomax and Isocracking methods, is a RCD type whose lifetime is long enough to treat about 20-30 bbl/lb heavy oil with an average heavy metal content. Bottom oil from the stripper tower, steam from a high-temperature flash tub, and heavy oil are heated to the required temperature with preheated hydrogen and mixed hydrogen gas, then sent to the reaction tower. Material produced in the reaction tower is heat-exchanged with the mixed hydrogen gas, cooled, and passed to a high-temperature separation tub. Cooled liquid withdrawn from the tub, after going through a turbine for power recovery, then passes to a high-temperature flash tub. Steam from this tub, after heat exchange with oil, is cooled and sent to a low-temperature flash tub. Steam from the high-temperature separator tub passes to a low-temperature separation tub. Rich in hydrogen, gas from the low-temperature separation tub is compressed and recycled to the reaction tower. Liquid from the low-temperature separation tub goes to a low-temperature flash tub for removal of hydrogen sulfide-containing gas, is preheated in the high-temperature separation tub, then sent to the stripper along with the high-temperature flash tub liquid. Heat recovered from the fuel oil obtained in the stripper is used to generate steam, while the large quantity of hydrogen sulfide obtained from the stripper and low-temperature flash tub is used as raw material for sulfur recovery equipment. For the desulfurization of oil containing a large concentration of heavy metals, the BOCU method is preferred.
APTIC-26133

SYMPOSIUM: RECENT PROBLEMS ON AUTOMOTIVE FUELS.

(Jidosha no nenryo mondai ni tsuite). Text in Japanese. Sekiyu Gakkai Shi (J. Japan Petroleum Inst., Tokyo), 13 (11):844-854, Nov. 1970.
H. Katayama, T. Kobayakawa, Y. Shibusawa, M. Harada, and N. Yatsumaki.
Identifiers: *Automotive emission control, Costs, Emission standards, Japan, Automotive emissions, Engine exhausts, Engine operating cycles, Fuels, Gasolines, Diesel engines, Vehicles, Catalytic afterburners, Fuel additives, Lead compounds, Carbon monoxide, Nitrogen oxides, Catalysts.

Problems concerning the control of pollution due to automobiles are discussed, particularly in terms of improvements of the engine and fuel. Exhaust emission control is mainly reviewed from a panel discussion of the Petroleum Society (Feb. 8, 1970, Osaka), with some corrections to bring the situation up to date and additions pertaining to conditions in Europe and the United States. Composition and the properties of gasoline are correlated to the composition of automobile exhaust, while engine operation is related to its fuel. Recent problems concerning light diesel oil, catalysts for cleaning exhaust emissions, and the production of leadless gasoline and its cost are reviewed. Emission control in Japan pertains to tail pipe exhaust, not to crankcase emissions or evaporation losses, in spite of their regulation in Europe and the United States. The amount of carbon monoxide which can be emitted is less in Japan than in the United States, as in the latter country it is determined from the average amount emitted rather than a maximum. Although methods for controlling carbon monoxide have been developed, simultaneously treating the oxides of nitrogen presents a problem. Recirculating exhaust gas for intake air is a possible way to control the nitrogen oxides. Standards to control the particulate matter emitted from automobiles yet need to be established in Japan.
APTIC-26134

PRESENT SITUATION AND OUTLOOK OF FLUORIDES AIR POLLUTION PREVENTION TECHNOLOGY--TACKLING WITH ALUMINUM SMELTING POLLUTION.

For primary bibliographic entry see Field 01.
APTIC-26136

DISTURBANCE OF ACID-BASE AND ENZYME EQUILIBRIUM IN EXPERIMENTAL INTOXICATION WITH SO2 AND PROTECTIVE ACTION OF AMMONIA.

For primary bibliographic entry see Field 07.
APTIC-26138

LUCAS BACK THE ZINC-AIR BATTERY.

Engineering (London), 203 (5260): 204-205, Feb. 10, 1967.
Personal Author Not Recorded.
Identifiers: *Zinc, *Storage batteries, *Automobiles, Great britain, Electric propulsion, Automotive emission control, Design criteria, Zinc compounds, Oxides, Oxygen, Electrolysis.

Great Britain's leading automotive electrical firm, Joseph Lucas, has completed an agreement with General Dynamics of San Diego, California, to develop a zinc-air battery. This cell operates by converting zinc to zinc oxide in a system using relatively common and low-cost materials, and aqueous electrolyte, and moderate operating temperatures. Metallic zinc is plated on inert backing sheets, and oxygen for the reaction is derived from air pumped in from the atmosphere through porous nickel electrodes. The electrolyte is a dilute solution of potassium hydroxide which is continuously circulated through the cell stack. External storage of the reactants aids cooling and reduces the quantity of electrolyte required, while it also eliminates the need for supporting structures to hold the reactants, thus greatly reducing weight. Other components of the system are mentioned, as well as some energy variables.
APTIC-26140

FERRIC SULPHATE AND SULPHURIC ACID FROM SULPHUR DIOXIDE AND AIR.

Bureau of Mines, Washington, D. C., Rept. of Investigations 2556, 7p., Dec. 1923. 2 refs.
Edmund S. Leaver, and R. V. Thurston.
Identifiers: *Catalytic oxidation, *Iron compounds, *Sulfur dioxide, *Sulfates, Copper, Combustion gases, Primary metallurgical processing, By-product recovery, Sulfuric acid.

During the development of a sulfur dioxide leaching process for treating 'mixed' copper ores,

the pulp from the treatment of roasted cupriferous pyrite with sulfur dioxide gases and water showed an unexpected amount of sulfuric acid. This was due to iron in the solution; the iron tended to oxidize to the ferric state if the concentration of sulfur dioxide in the roaster gases did not rise above a certain figure. The percentage of iron present was sufficient to cause an entirely different set of conditions from those of the original sulfur dioxide leaching process and to promise a much wider application of the general idea. It is possible that ferric sulfate and sulfuric acid solutions, prepared from a cheap form of sulfur dioxde, will be utilizable for the treatment of all oxidized copper minerals and for the recovery of copper from concentrator tailing where the copper is present both in oxidized minerals and in sulfides or native state which can be attacked by ferric sulfite. Preparation of the solutions is reviewed. (Author introduction modified)
APTIC-26142

PRESENT PERFORMANCE AND SCOPE FOR IMPROVEMENT IN POWER-STATION ELECTROSTATIC PRECIPITATORS.

(Inst. of Mechanical Engineers, London
(England), Proc. Conf. Mech. Engrs. Contrib.
Clean Air, London, 1957, p. 42-59. 8 refs.
J. S. Forrest, and H. J. Lowe.
Identifiers: *Electrostatic precipitators, Costs, Great britain, Dusts, Steam plants, Operating variables, Particulate classifiers, Collectors, Design criteria, Flow rates, Electrical properties.

The results of tests to determine the performance of electrostatic precipitators, and combined electrostatic and mechanical dust arrestors at power stations are presented. The collecting efficiency of 30 stations in England ranges from 95% to over 99.5%, with a mean value of 98.5%. The present capital expenditure of England's Central Electricity Authority is over $5.8 million per year. Important features of precipitator design are discussed, and information is given on operating experience. The performance of precipitators is affected by dust characteristics. Since the dust is a complex mixture difficult to describe in terms of a single parameter, it is often described in terms of the terminal velocity of the particles in cm/sec, or 'vels'. Future developments in precipitator design are considered, particularly improved methods of electrical control. An indication is given of the scope for overall improvement in plant performance. A discussion of the paper is included with the text. (Author abstract modified)
APTIC-26143

EXHAUST EMISSION CONTROL BY FUEL INJECTION: THE VW 1600 WITH ELECTRONICALLY CONTROLLED FUEL INJECTION SYSTEM.

Preprint, Society of Automotive Engineers, Inc.,
New York, 7p., 1967. 3 refs. (Presented at the
Society of Automotive Engineers Southern
California Section Meeting, Oct. 9, 1967, Paper
680192.)
Werner Buttgereit, Christoph H. Voges, and
Christopher Schilter.
Identifiers: *Timed fuel injection, Germany, Engine exhausts, Engine operating cycles, Automobiles, Air-fuel ratio, Electrical measurement devices.

The 1968 models of the VW 1600 sedan for the U. S. market are equipped with an electronically controlled fuel injection system for controlling exhaust emission. These vehicles comply with existing exhaust emission standards, without need of auxiliary equipment. Engine fuel requirements for constant operating conditions were determined by exhaust gas analysis. The test results furnished the basis for fuel metering by means of an electronic control unit. Deceleration fuel shutoff and closely controlled mixture enrichment for cold starting, warmup, and full load ensure low emissions and good driving characteristics. These results were obtained with full interchangeability of all parts. There are no adjustments to be made within the injection system nor is matching to the individual engine necessary. Push-button checks for all the major circuit functions can be carried out with a special checking instrument.
APTIC-26147

A METEOROLOGICALLY OPERATED STACK CONTROL SYSTEM.

J. Appl. Meteorol., 2 (4):431-439, Aug. 1963. 5 refs.
Gerald C. Gill, and Eugene W. Bierly.
Identifiers: *Stacks, *Control equipment, *Winds, Stack gases, Reactors (nuclear), Computers, Meteorological instruments.

The standard deviation of wind direction and the mean wind speed are incorporated into a system for controlling the release of radioactive gaseous wastes from the 200-ft stack of the Enrico Fermi Atomic Power Plant. The meteorological sensor used in the system is a Bendix-Friez Aerovane, located on top of a 100-ft meteorological tower near the stack. Data from the Aerovane are processed by a small analog computer whose outputs are displayed on the control board of the reactor control room and recorded on strip chart recorders. The display enables the reactor operator to know whether the stack is open to the atmosphere or whether the gases are being stored in containment tanks. Averaging times of the meteorological variables may be switched to 3, 6, 12 or 24 minute periods. A discussion of several representative records from the computer and the Aerovane are included, pointing out some of the interesting features of this system. (Author abstract modified)
APTIC-26148

THE FORMATION OF CARBON DISULFIDE RESULTING FROM THE REACTION BETWEEN SULFUR DIOXIDE AND COAL.

(Ueber die Bildung von Schwefelkohlenstoff bei
der Einwirkung von Schwefeldioxyd auf Kohle).
Text in German. J. Prakt. Chem., vol. 104:207-240,
1922. 49 refs.
B. Rassow, and K. Hoffmann.
Identifiers: *So2 removal (combustion products), *Carbon disulfide, Charcoal, Germany, Coal characteristics, Carbon dioxide, Carbon monoxide, Reduction, Reaction mechanisms, Temperature.

The formation of carbon disulfide from the reaction between sulfur dioxide and charcoal under conditions of white heat was followed analytically over the entire temperature range. At 700 C only traces formed, from 750 C on a steadily increasing amount of CS2 formed aside from carbon oxysulfide, CO2, sulfur vapors and at first a small quantity of CO. The formation of CS2 reached its maximum at 850-900 C. The sulfur from SO2 was at this temperature divided between CS2 (35%), COS (55%) and free sulfur (10%) with small quantities of CO and CO2 completing the composition of the gas mixture. Above 900 C the quantity of free sulfur increased at the cost of CS2 and COS. The oxygen from SO2 appeared almost entirely in the form of CO aside from the share in COS. Above 1100 C no CS2 formed; COS formed only in small quantity; free S and CO were the only reaction products. The process has no technical application because even under the most favorable conditions great quantities of COS form which is explosive when mixed with air and is difficult to handle.
APTIC-26155

AN ABSORPTION SCRUBBER FOR DESULFURIZATION.

(Absorptionsskrubber for avsvavling). Text in
Swedish. Tek. Tidskr., 98 (3):37-38, 1968.
Gosta Bahno.
Identifiers: *Scrubbers, *Absorption (general), Costs, Continuous, Sweden, Combustion gases, Dusts, Automatic methods, Centrifugal separators, Hydroxides, Calcium compounds, Ph.

The Bahco Company of Enkoping, a suburb of Stockholm, Sweden, has developed a new type of scrubber for the removal of gaseous sulfur compounds from flue gases, using calcium hydroxide as the absorbing agent. The equipment has been designed in such a way that the absorbent can be fed continuously into the chamber where it contacts the sulfur dioxide-laden gas, and can be removed continuously in the form of sludge from the bottom end of the equipment; the whole process is controlled automatically by a device that measures the pH of the solution and makes the necessary adjustments. The dust is removed with a cylcone. The total elimination yield is 93-95% dust and a 98% absorption of SO2 when the pH of the system is set for 6.5. The cost of energy required for SO2 purification is 35 MW, or 30 Gcal/hr when the plant uses fuel oil with a 2.5 wt % sulfur content. This fugures out to a cost of approximately $2.73 per cubic meter of oil over a 5-year period and $2.5 over a 20-year period. Figures are also given for the cost of the lye and the removal of sludge. For each ton of fuel oil burned, 200-300 kg of sludge is produced.
APTIC-26159

METHOD FOR THE DESULFURIZATION OF GASES CONTAINING HYDROGEN SULFIDE OR SULFUR DIOXIDE AND FOR THE PREPARATION OF CRYSTALLINE SULFUR.

(Verfahren zum Reinigen von
schwefelwasserstoff-bzw. schwefeldioxydhaltigen
Gasen unter Gewinnung von Schwefel in
kristallinischer Form). Text in German. (Assignee
not given.) Ger. Pat. 571,862. 3p., Feb. 16, 1933.
(Appl. May 17, 1931, 1 claim).
Julius Zorkoczy.
Identifiers: *Absorption, *By-product recovery, *So2 removal (combustion products), *Hydrogen sulfide, Europe, Combustion gases, Alcohols, Benzenes, Toluenes, Pyridines, Sulfites, Catalysts.

Hydrogen sulfide-containing industrial gases (primarily gases from the gasification of coal) are desulfurized by washing them in sulfur dioxide and H2S saturated methyl- or ethylalcohol or in glycerin or in their mixture with the addition to the washing solutin of 2% benzol, 1% toluol, and 0.5% pyridine before, during, or following washing. The reaction between SO2 and H2S takes place in alcohol which is a much better solvent of both gases than water and thus a much higher SO2 concentration is achieved than by any other process. The grains of the precipitated sulfur are the courser the higher the SO2 concentration; the amorphous S is catalytically converted to its crystalline form by the addition of benzol, toluol, and pyridine and precipitates in the form by the addition of benzol, toluol, and pyridine and precipitates in the form of needles. The process is carried out in an absorption installation with the necessary SO2 generated by combustion of S or by decomposition of sulfite liquor. The gas leaving the tower is saturated with alcohol and also contains SO2 which are reclaimed by washing with water. The alcohol is distilled from the water and returned into the process. The process removes H2S from industrial gases quantitatively.
APTIC-26163

PROCESS FOR THE REMOVAL AND RECLAMATION OF SULFUR DIOXIDE FROM FLUE GASES.

(Verfahren zur Entfernung und Wiedergewinnung
von Schwefeldioxid aus Rauchgasen). Text in
German. (Badischen Anilin- und Soda-Fabrik A.
G., Ludwigshafen (West Germany)) West Ger.
Pat. 1, 273,501. 3p., July 25, 1968. (Appl. March 30,
1966, 3 claims).
Erich Haarer, Ernst Fuerst, Johann Langer, and
Harald Stahl.
Identifiers: *By-product recovery, *Absorption (general), Germany, Combustion gases, Stack gases, Scrubbers, So2 removal (combustion products), Organic acids, Phthalic acid, Aromatic hydrocarbons.

Sulfur dioxide in flue gases is absorbed by a solvent which is a cyclical imidic derivative of preferably succinic, glutaric or o-phthalic acid with - (CH2)-n-O-R as the general formula of the substituent for the imidic hydrogen atom; n equals 1 to 3; R is a methyl, ethyl, propyl, butyl, or a phenyl radical. The absorption is accomplished at the natural temperature of the flue gas such as 140 C by washing in a column; the absorbed SO2 is subsequently reclaimed by heating, by a reduction of pressure, or by injection of an inert gas. Suitable solvents are n-methoxypropyl-succinimide and n-methoxypropyl hexahydrophthalimide which combine high solubility for SO2 with low solubility for CO2, so that the reclaimed SO2 is of high purity. Sulfur dioxide is by this method removed from flue gases by 99.5%. Solvents of low vapor pressure at operating temperatures should be used to avoid loss of solvent. To solvents which do not meet this requirement, adipic acid diamide should be added which reduces vapor pressure and does not react with SO2.
APTIC-26164

PREPARATION OF SULFUR BY THE INTERACTION OF SULFUR DIOXIDE CONTAINING GASES WITH HEATED CARBON IN THE PRESENCE OF METAL COMPOUNDS.

(Verfahren zur Gewinnung von Schwefel durch
Einwirkenlassen von Schwefeldioxyd
enthaltenden Daempfen auf Kohlenstoff in der
Hitze in Gegenwart von Metallvergindungen).
Text in German. (Thiogen Co., San Francisco,
Calif.) Ger. Pat. 271,002. 3p., Nov. 24, 1912. (Appl.
date not given, 3 claims).
Personal Author Not Recorded.
Identifiers: *By-product recovery, *Alkaline additives, *Catalysts, *Reduction, Limestone, Combustion gases, So2 removal (combustion products), Calcium compounds, Copper compounds, Iron compounds, Manganese compounds, Carbon dioxide, Iron oxides, Sulfates, Sulfides, Sulfites, Steam.

Sulfur is prepared from sulfur dioxide present in roasting gas by interaction with a carbonaceous reducing agent (coal, oil) in the presence of lime, limestone, or calcium sulfide at about 700 C with oxides of iron, copper or manganese added as a catalyst. When a solid reducing agent is used, lime or limestone is impregnated with the liquid reducing agent. Sulfur dioxide is reduced by the carbonaceous material to sulfur. Simultaneously SO2 reacts with calcium oxide to form calcium sulfite which is reduced by C to calcium sulfide. Calcium sulfide reacts with further quantities of SO2 yielding S and calcium sulfite which is again reduced, so that a continuous reaction is achieved. It is irrelevant whether in the beginning lime, limestone, calcium sulfide, calcium sulfite, or calcium sulfate are present in a heated retort because the process is a cyclical one. The addition of metal oxides accelerates the reaction and prevents the formation of odorous organic sulfur compounds. The process operates within a fairly wide temperature range. The resulting mixture of CO2, vaporized sulfur, and steam leaving the reaction chamber can be separated in any of a number of ways.
APTIC-26165

AIR POLLUTION: FURNACE TYPES AND SIZES DICTATE MOST EFFECTIVE CONTROLS. PART I.

Iron Age, 175 (17):100-102, April 28, 1955. PART
II. Ibid, 175 (18):110-112, May 5, 1955. PART III,
Ibid, 175 (19):100-102, May 12, 1955.
N. R. Shaffer, and M. A. Brower.
Identifiers: *Furnaces, *Primary metallurgical processing, *Control methods, Regulations, Aluminum, Iron, Steel, Lead, Zinc, Dusts, Fumes, Electrostatic precipitators, Bag filters.

Atmospheric emissions from steel furnaces, iron foundries, and nonferrous smelters in Los Angeles County are regulated by two rules. One limits the opacity of an emission by making illegal opacities of 40% or more for a period in excess of three min in any hour. The second rule regulates emissions by pounds per hr, depending on the weight of material charged. The baghouse has proved to be the most efficient control device for these emissions. Collection efficiencies are 99% for dust and fume from steel furnaces and 96-99% for dust and fumes from gray iron cupolas. Brass, aluminum, and lead smelters employing baghouses in combination with cooling chambers or cyclone separators are able to reduce furnace emissions to one lb or less per hr. Next in order of effectiveness are electrical precipitators, which have an efficiency of 97.5% for emissions from electrical steel furnaces, 96.5% on openhearth furnaces, and 96% on gray iron cupola gases. Water scrubbers have failed to meet control regulations for electric furnaces and gray iron cupolas.
APTIC-26166

THE SCA-BILLERUD RECOVERY PROCESS.

Pulp Paper Mag. Can. (Quebec), 66 (5):T-289 to
T-294, May 1965. 1 ref. (Presented at the 1st
International Sulphite Pulping Conference jointly
sponsored by the Technical Section, Canadian
Pulp and Paper Association, and the Technical
Association of the Pulp and Paper Industry,
Chicago, Ill., June 16-18, 1964.)
Bengt Hellstrom.
Identifiers: *Sulfite pulping, *By-product recovery, *Design criteria, Carbon black, Sweden, Combustion gases, Chemical processing, Centrifugal separators, Venturi scrubbers, Absorption (general), Carbonates, Sodium compounds, Sulfur dioxide, Sulfur compounds, Hydrogen sulfide, Sulfites, Pyrolysis.

The SCA-Billerud recovery process is a new method for recovering chemicals and heat from spent sulfite liquors from sodium-base pulping. The heart of the process is a reactor into which evaporated spent liquor is sprayed together with hot combustion gases containing excess air. In the reactor, a rapid pyrolysis reaction (shock pyrolysis) is constantly taking place. The liquor is converted into a combustible gas containing nearly all sulfur as hydrogen sulfide, plus a powder containing carbon and all sodium as carbonate. The immediate conversion of all sodium compounds to carbonate and the almost total separation of sulfur are unique for recovery systems. Treatment and utilization of the reaction products can be performed in conventional equipment. The only entirely new unit is the reactor, a mild steel cylindrical shell with an inner lining of ordinary fire brick. A technical description ir presented of the basic recovery process, along with a description of the units required in a full-scale plant.
APTIC-26171

OXIDATION OF KRAFT BLACK LIQUOR – WHERE DOES IT STAND°

Paper Trade J., 146 (30):39-48, July 23, 1962. 153
refs.
T. T. Collins Jr.
Identifiers: *By-product recovery, *Black liquor oxidation, *Odor counteraction, Corrosion, Kraft pulping, Design criteria, Sulfites, Catalysts.

The literature and patents on black liquor oxidation are reviewed in an attempt to clarify the sources of original discoveries. In addition, objections to foaming-type oxidation units are noted as are the advantages claimed for new systems such as the British Columbia Research Council, modified Trobeck, Tomlinson, and Weyerhauser systems. Also reported are studies on the application of oxidation systems in sulfite recovery, studies of the economics resulting from black liquor oxidation, studies showing reduced tube corrosion by oxidized liquor, catalyzed reactions of oxygen with alkaline sulfide solutions, and procedures for analyzing oxidized liquor samples. It is noted that many mills will now be forced to install oxidation systems as one step in more complete odor control programs. Mills that are not under criticism for stream or air pollution will probably continue to operate without oxidation systems. These mills will be among those not using extra sulfur above salt cake for make-up for desired sulfidity, that do not find an appreciable cost advantage in substituting soda ash for part of the salt cake, and that do not wish to oxidize liquor merely to balance the saving of fuel for reburning lime.
APTIC-26172

RECENT DEVELOPMENTS IN BLACK LIQUOR OXIDATION.

Paper Trade J., 148 (12):30-34, March 23, 1964. 8
refs.
E. T. Guest.
Identifiers: *Black liquor oxidation, *Odor counteraction, Canada, Stack gases, Odors, Kraft pulping, Pilot plants, Packed towers, Hydrogen sulfide.

It is possible to eliminate almost completely hydrogen sulfide from kraft mill stack gases with a fully oxidized black liquor, followed by a properly loaded and operated furnace. When the definite odor reduction in the evaporator condensate is also considered, it is evident that oxidation is an essential link in overall odor control. The most prevalent oxidation techniques are the Collins system, the British Columbia Research Council system, and the Troebeck-Ahlen system. Of these, the Troebeck-Ahlen and the Collins type oxidize by forcing air through the liquor in a manner to make a controlled volume of foam. The BCRC unit operates with air blowing concurrently with the liquor over specially designed plates. Other systems are packed columns with either concurrent or countercurrent air, compressed air in a tank of liquor, or compressed air in a pipeline. A detailed discussion is presented of pilot-plant work on the Troebeck-Ahlen unit together with a summary of pilot-plant results. The data have been incorporated into the design of commercially available towers.
APTIC-26173

ELIMINATION OF ODORS IN A SULPHATE PULP MILL.

Tappi, 37 (5):201-205, May 1954. 12 refs.
(Presented at the 7th Alkaline Pulping Conference
of the Technical Association of the Pulp and Paper
Industry, Houston, Tex., Nov. 18-20, 1953.)
Pietro Ghisoni.
Identifiers: *Kraft pulping, *Odor counteraction, Italy, Valleys, Stack gases, Boilers, Digesters, Evaporators, Scrubbers, Black liquor oxidation, Chlorine, Mercaptans, Oxidation.

A plant for eliminating mercaptans from an Italian sulfate pulp mill is described. The mill is located in a narrow valley, on a river with a very limited water flow, near a heavily populated area. The main operations in the odor control plant are: (1) condensation of all relief and blow gases with indirect condensers; (2) use of the condensed water as dilution water in a chlorination tower of the bleaching plant; (3) the noncondensable gases are burnt in one boiler together with natural gas; (4) the smoke from the recovery boiler is cooled to the dew point, then oxidated with chlorine and again heated to avoid corrosion in the chimney. (Author abstract modified)
APTIC-26176

PROCEDURE FOR THE MANUFACTURE OF SULFUR FROM SULFUR DIOXIDE OR FROM GAS MIXTURES CONTAINING SULFUR DIOXIDE.

(Fremgangsmate ved fremstilling av svovel av
svovelsyrling eller svovelsyrlingholdige
gassblandinger). Text in Norwegian. (Assignee not
given.) Norw. Pat. 55,862. 1p., June 29, 1936.
(Appl. April 13, 1934, 1 claim).
F. Tharaldsen.
Identifiers: *Carbon disulfide, *Reduction, *So2 removal (combustion products), Europe, Combustion gases, Primary metallurgical processing, By-product recovery, Catalysts, Temperature.

A process is described which is especially designed for use with waste gases from pyrite roasting, where it is impossible for economic reasons to purify the sulfur dioxide gas before its conversion to useful products such as sulfur. An earlier method, which consists of passing the sulfur dioxide over a bed of glowing coals, is improved by the simultaneous introduction of vaporized elemental sulfur over the bed of coals. This causes the sulfur and carbon (in the coal) to unite and form carbon disulfide; the carbon disulfide reacts with the sulfur dioxide to form carbon dioxide and elemental sulfur. The invention is conceived for use with the same type of equipment used for the manufacture of carbon disulfide; the temperature in the electric oven is about 1000 C.
APTIC-26178

METHOD FOR OBTAINING SULFUR FROM THE GASEOUS PRODUCTS GIVEN OFF BY THE ROASTING AND SMELTING OF SULFIDE ORES.

(Satt att utvinna svavel ur rost-och hyttgaser fran
sulfidmalmer). Text in Swedish. (Assignee not
given.) Swed. Pat. 42,657. 2p., June 13, 1917.
(Appl. Sept. 9, 1912, 4 claims).
A. G. Andersson.
Identifiers: *Catalysts, *So2 removal (combustion products), *Reduction, Sweden, Combustion gases, Coal, Coke, Primary metallurgical processing, By-product recovery, Sulfides, Condensation, Steam.

Economies in the recovery of sulfur as a byproduct is achieved by making use of more economical reducing agents, such as coal and coke, and by utilizing the heat given off by the exhaust gases. A portion of the roasting gas mixture is channeled through or over a glowing layer of carbon, while the remainder of the gas is run through a regenerating or recovering device, where it absorbs heat, after which the two fractions are made to react with each other; the one fraction of gas is reduced to sulfur, while the other portion of gas gives up to the reaction the heat it has acquired. Elemental sulfur is recovered at this point by condensation, using a conventional method. A particular embodiment of the invention makes use of water or steam as an additive to the roasting gas mixture.
APTIC-26179

METHOD FOR MANUFACTURING SULFUR FROM ROASTING GASES CONTAINING SULFUR DIOXIDE.

(Satt att framstalla svavel ur svaveldioxidhaltig
rostugnsgaser). Text in Swedish. (Bolidens
Gruvaktiebolag, Stockholm (Sweden)) Swed. Pat.
91,742. 2p., March 18, 1938. (Appl. March 5, 1936,
8 claims).
P. H. W. Agren.
Identifiers: *So2 removal (combustion products), Sweden, Combustion gases, Coal, Coke, Primary metallurgical processing, By-product recovery, Adsorption (general), Sulfur compounds, Catalysts, Reduction, Cooling, Temperature.

The process of manufacturing sulfur from roasting gases containing sulfur dioxide consists of two stages: 1) the sulfur dioxide content of the roasting gases is enriched by cooling a portion of the gases to a suitable temperature (30 C) and causing the cooled gases to pass over an adsorbent material, which captures some of the sulfur dioxide contained in the mixture, after which another portion of the original gas mixture is brought over the same adsorbent material at a higher temperature (100 C), causing the adsorbing agent to give up some of its trapped SO2, thereby enriching the second portion of the gases; and 2) the enriched gas mixture is then reduced with coke or other carboniferous material, possibly in the presence of a catalyst, according to a conventional procedure.
APTIC-26180

REDUCING JET POLLUTION BEFORE IT BECOMES SERIOUS.

Astronaut. Aeronaut., 8 (4):62-67, April 1970. 10
refs.
Robert F. Sawyer.
Identifiers: *Smokes, *Jet aircraft, *Combustion air, Design criteria, Hydrocarbons, Carbon monoxide, Combustion, Pressure, Temperature, Nitric oxide (no).

Smoke-controlling combustors to be installed on turbojet engines in 1972 may control smoke but not necessarily pollution. Of jet aircraft emissions, smoke poses the slightest health hazards; invisible gases such as carbon monoxide, unburned hydrocarbons, and smog-producing nitric oxide are much more serious. Nitric oxide levels may actually be increased by the new combustors which are characterized by higher temperatures, higher operating pressures, and higher combustor equivalence ratios. If pollutant levels are to be reduced, future combustors must be designed to assure that exhaust gas attains chemical equilibrium and to prevent the phenomenon of 'thermal quenching'.
APTIC-26181

CLOSED-TOP CUPOLAS END AIR CONTAMINATION.

Foundry, vol. 82: 4p., Dec. 1954.
Robert H. Herrmann.
Identifiers: *Cupolas, *Scrubbers, Fly ash, Collectors.

High operating efficiency plus almost complete elimination of atmospheric contamination is claimed for four hot-blast sealed cupolas with wet impingement-type collectors. The cupolas, which have been installed for about one year, are arranged in groups of two, each group being served by one heat exchanger and fly ash collector. Gases leave the cupola stack near the top through a brick-lined flue which leads to the bottom of the recuperative hot blast system. A second flue carries gases from the top of this unit to the bottom of the wet dust collector, cleaned gases being drawn from the collector by an exhauster and discharged into the top of the collector where additional entrained moisture is removed. The entire system is automatically controlled.
APTIC-26184

STUDY OF THE SO2 OXIDATION IN SOLUTION AND ITS ROLE IN ATMOSPHERIC CHEMISTRY.

Quart J. Roy. Meteorol. Soc. (London), vol. 84:46-
55, Jan. 1958. 11 refs.
E. Junge, and T. G. Ryan.
Identifiers: *Catalytic oxidation, *So2 removal (combustion products), Aerosols, Smog, Fog, Rain, Ammonia, Catalytic activity, Reaction mechanisms.

The mechanism of sulfur dioxide oxidation in diluted catalytic solutions was studied. It was found that the oxidation stops after a certain pH value is reached. In the same catalytic solutions, the maximum possible sulfate radical formation is a linear function of the SO2 partial pressure in air. The mechanism of SO4 formation can account for observed SO4 concentrations in rain, fog, and smog only if some neutralizing cations in the aerosols or traces of ammonia in the air are present. In the latter case the system SO2-NH3 - catalytic solution can explain the main features of SO4 formation in the atmosphere. It is suggested that dense aerosol formation in SO2-polluted atmospheres may be considerably decreased not only by reducing the release of SO2 but also by the judicious decrease of NH3 and good catalytic aerosols. (Author abstract modified)
APTIC-26185

DESIGN AND APPLICATION OF GREASE FILTERS.

ASHRAE (Am. Soc. Heating, Refrig. Aircond.
Engrs.) J., 6 (5):64-71, May 1964. 6 refs. (Presented
at the ASHRAE Semiannual Meeting, New
Orleans, La., Jan. 27-29, 1964.)
Roger M. Pasch.
Identifiers: *Design criteria, *Grease filters, Impingers, Filters, Ventilation.

Grease filters have established themselves as a integral part of kitchen exhaust systems in both commercial and residential installations, and are required by law in many areas. Since the overall effectiveness of the exhaust systems are determined to a large degree by the design and selection of the grease filters, considerations essential to proper design and application are reviewed. The functions of the grease filter system and the characteristics of a well-designed system are discussed. Typical grease filter performance data are presented along with a discussion of the characteristics common to impingement type filters. Included in the discussion are the effects of mounting angle, temperature and air velocity on filter efficiency. A method of testing and rating grease filters is given. The test method is quite simple mechanically, requiring only nominal skills to produce consistent performance values. (Author introduction modified)
APTIC-26186

A BRIEF REVIEW OF FLUE GAS TREATMENT.

Eng. Mining J., 92 (24): 1115-1116, Dec. 9, 1911.
Personal Author Not Recorded.
Identifiers: *Stack gases, *Primary metallurgical processing, *Control equipment, Steel, Dusts, Fumes, Stacks, Electrostatic precipitators, Bag filters, Scrubbers.

For metallurgical works having long flues, satisfactory deposition of flue dust, and to a certain extent fumes, can be obtained by means of cooling pans and water sprays such as Koerting nozzles. Though not universally applicable, a more effective method is the baghouse. The life of the bags can be prolonged by introducing zinc oxide, or some other base, into the flues to neutralize any acids present. When used with lead and copper furnaces, provisions must be made to reduce the temperature of the gases. The centrifugal scrubber finds a large use in the metallurgy of steel, while perforated plate scrubbers are extremely effective in removing soluble substances from gases. Another control measure is the Cottrell system of electrolytic condensation, which depends on the agglomeration of floating particles by high-potential charges. The use of tall chimneys or lattice work stacks must be considered of doubtful advantage.
APTIC-26195

IMPROVED METHOD OF MAKING SULPHUR FROM SULPHUR DIOXIDE.

(American Smelting and Refining Co., New York)
Brit. Pat. 144,306. 4p., Sept. 5, 1921. (Appl. June 3,
1920, 6 claims).
Guy Clemens Howard.
Identifiers: *Catalysts, *Reduction, *So2 removal (combustion products), Combustion gases, Coke, Primary metallurgical processing, By-product recovery, Sulfur compounds, Drying, Temperature.

Known processes for recovering sulfur from smelter or roasting gases entail subjecting the sulfur dioxide-containing gases to the reducing action of incandescent coke. They are characterized by the occurrence of detrimental secondary reactions. The present invention prevents these reactions by holding the moisture content of gases going to the reduction furnace to a minimum and thus facilitates temperature control of the furnace. This is accomplished by first liquefying sulfur dioxide, then vaporizing the liquid to produce a refrigeration agent. The refrigerant is mixed with a

regular amount of dehydrated sulfur dioxide and the mixture preheated by the heat action of combustion products from the reduction furnace. The heat increment sustains the necessary furnace temperature for complete reduction of the sulfur dioxide.
APTIC-26197

HYDROCARBON CONTROL FOR LOS ANGELES BY REDUCING GASOLINE VOLATILITY.

Preprint, Society of Automotive Engineers, Inc., New York, 24p., 1969. 20 refs. (Presented at the International Automotive Engineering Congress, Detroit, Mich., Jan. 13-17, 1969, Paper 69087.)
Edwin E. Nelson.
Identifiers: *Volatility, *Fuel evaporation, *Automotive emission control, Gasolines, Hydrocarbons, Vapor pressure.

Evaporative tests were conducted on 55 cars to determine if evaporative losses would be reduced by lowering gasoline volatility. Reduction of Reid vapor pressure from 9.7 to 5.9 psi resulted in a 59.0% reduction in evaporative losses. This means that a reduction of 3 psi in Reid vapor pressure would reduce evaporative emissions by about 50%, resulting in a 12% decrease (228 tons per day) in hydrocarbon emissions in the Los Angeles area. The use of low volatility gasoline also produces a comparable reduction in total evaporative emission reactivity. It has no significant effect on exhaust hydrocarbon emission or on total exhaust gas reactivity. Customer acceptance of low volatility gasoline was demonstrated in an 1800 car survey of driveability.
APTIC-26199

EFFECTS OF GASOLINE ADDITIVES ON CARBURETOR AND PCV SYSTEMS PERFORMANCE AS THEY RELATE TO EXHAUST EMISSIONS.

APRAC Proj. CAPE 2-69, Scott Proj. 2807, 84p., April 30, 1970. NTIS: PB 195143
Personal Author Not Recorded.
Identifiers: *Automotive emissions, *Gasolines, *Fuel additives, Research programs, Engine operating cycles, Operating variables, Automobiles, Statistical analyses.

A gasoline additive study is underway to measure the effects of gasoline additives on carburetor and pollution control valve (PCV) systems. Three groups of 16 cars, or a total of 48 fleet vehicles, are to be driven in normal urban and suburban modes of operation over 24,000 miles under controlled fuel conditions and maintenance. Two of the three groups' test fuels contain a gasoline additive which is added to the base fuel. During the first year of the program, exhaust emission measurements were made as the vehicles started the test and at each subsequent 4000 mile interval. An analysis of variance was conducted on each of 19 emission parameters for the zero and 4000-mile interval. A major conclusion reached on the basis of these analyses is that no significant differences in emission parameters existed at the 4000-mile point on the basis of fuel employed. A secondary conclusion drawn concerns the make factor: all emission parameters vary significantly between makes; however, no single make is consistently the highest or lowest valued across the spectrum of the 19 measured emission parameters. Volkswagons were distinctly different to such a degree that their data was not included in the final analysis. Test results and variance analyses are summarized in tabular form. (Author abstract modified)
APTIC-26200

THE BURKHEISER GAS PURIFICATION PROCESS FOR THE RECOVERY OF AMMONIA, CYANOGEN AND HYDROGEN SULFIDE.

(Das Burkheisersche Gasreinigungsverfahren. Zur Gewinnung des Ammoniaks, des Zyans und des Schwefelwasserstoffes). Text in German. Gas Wasserfach, 69 (36):765-771, 1926. 1 ref.
W. Burkheiser.
Identifiers: *Scrubbers, *Absorption (general), Germany, Combustion gases, By-product recovery, Process modification, Design criteria, Ammonia, Cyanates, Iron compounds, Iron oxides, Sulfates, Oxidation, Hydrogen sulfide.

The Burkheiser method combines gas purification and by-product recovery in a single process. Because of various difficulties the process was modified and perfected 3 times with the last modification resulting in wet purification and wet recovery. Following the separation of tar from the gas, hydrogen sulfide and cyanogen are separated in a rotating washer consisting of 5 double chambers with 10 compartments where a mix of ironoxyhydrate and of ammoniacal water is kept in intimate contact with the gas through agitation and where ammonium sulfide forms which subsequently reacts with Fe203 yielding iron sulfide. Cyanogen is also absorbed in the form of alkaline thiocyanates which, because of their solubility, are easily separated from the iron sulfides. The washer yields a suspension of ammonium polysulfides, of alkaline thiocyanates, and of iron sulfides. In a settling tank the iron sulfides are separated from the dissolved ammonium polysulfides and thiocyanates which form a clear liquid and are further processed in an evaporator to dry sulfur and thiocyanates. The iron sulfides are oxidized to iron oxide which is returned to the process and to sulfur which is burned to SO2 and combines in separate washers with ammonia from the gas yielding ammonium sulfate. Whether the process works on a large scale profitably has hitherto (1926) not been established even though it was evaluated by a special commission in 1917.
APTIC-26201

THE TECHNICAL PROCESSES FOR THE DESULFURIZATION OF GASES.

(Die technischen Verfahren der Entschwefelung von Gasen). Text in German. Gas Wasserfach, vol. 72:442-445, 1929. 28 refs.
Horst Brueckner.
Identifiers: *Catalytic oxidation, *Absorption (general), Carbon black, Germany, Alkaline additives, Design criteria, Ammonia, Carbonates, Cyanides, Calcium compounds, Iron compounds, Silicates, Hydrogen sulfide.

Old methods of gas desulfurization removed hydrogen sulfide by means of iron hydroxide (dry, discontinuous process) or by a suspension of iron hydroxide with oxalic and tartaric acid (wet process). The most important method removes H2S from gas with activated carbon. I. G. Farben developed this into an industrially feasible method which has the added advantage of removing from gas also a considerable part of the organic sulfur compounds. The raw gas containing ammonia is mixed with the necessary quantity of air which is led through containers filled with activated carbon where H2S is oxidized to sulfur. The carbon absorbs more than its weight of sulfur (one cu m absorbs 400-600 kg S) and, following saturation, is leached with a solution of ammonium sulfide which is further processed to crystalline sulfur. An attempt has been made to substitute silica gel for the activated carbon. Other methods propose to remove H2S by alkaline solutions (carbonate), by lime milk, by ammonia, by water under pressure, and by SO2. A solution of sodium carbonate with potassium ferricyanide saturated with CO2 is an excellent oxidizing agent for H2S. In this process potassium ferricyanide is regenerated electrochemically. The sulfur content in gases can be reduced to less than 1 g per 100 cu m by copper at 400 C, by lead at 400 C, by silver at 250 C, or by gold at 300 C with the metals precipitated in powder form on asbestos, pumice or ceramic.
APTIC-26202

A CENTRALIZED INCINERATION FACILITY FOR INDUSTRIAL WASTE DISPOSAL.

Water Sewage Works, 116 (R.N.):R-197-R199, R201-R202, Nov. 28, 1969. 1 ref. (Presented at the National Pollution Control Conference and Exposition, 2nd Annual, Houston, Tex., April 22-24, 1969.)
Albert C. Fantz.
Identifiers: *Furnaces, *Incineration, Stack gases, Soot, Chemical processing, Kilns, Solid waste disposal, Scrubbers, So2 removal (combustion products), Design criteria, Hydrochloric acid, Hydrocarbons, Sulfur compounds, Oxidation, Combustion.

An incineration facility to be constructed on the Houston Ship Channel will have a capacity of 15,000 tons of waste per month, representing about 20-25% of the quantity of waste from the area chemical plants available for treatment. The facility's location will make it available by barge, truck, or rail car. Incoming receipts will be divided into three categories. Those that can be atomized or otherwise converted into small particles will be treated in a 'liquid' furnace that is basically an adiabatic combustion chamber. Materials having large contents of ash or inorganic noncondensibles will be incinerated in a rotary hearth. Materials that are relatively large in size and those that burn slowly will be incinerated in a rotary kiln. Combustion gases from the three incinerators will be combined, then taken to a secondary combustion furnace where oxidation of potential or actual gas pollutants will be completed. This chamber is designed to combine the three essential elements of combustion--time, temperature, and turbulence--in such a manner as to complete burning of soot, hydrocarbon vapors, of sulfur-containing materials, and of odor or smog-producing compounds. Before passing to the stack, the combustion gases will be treated in a wet scrubber for the simultaneous removal of particulates, sulfur oxides, and hydrogen chloride. As pressures to conform to pollution control regulations become more severe, a centralized facility such as that described may be the only alternative to plant shut-down.
APTIC-26204

REMOVAL OF SULFUR COMPOUNDS FROM COAL GAS.

In: Chemistry of Coal Utilization. Vol. 2, New York, Wiley, 1945, Chapt. 26, p. 947-1007. 213 refs.
Herbert A. Gollmar.
Identifiers: *Fuel gases, *By-product recovery, *Desulfurization of fuels, Combustion gases, Coal, Scrubbers, Alkaline additives, Sulfuric acid, Hydrocyanic acid, Ammonia, Ethers, Organic sulfur compounds, Mercaptans, Thiophene, Carbon disulfide, Hydrogen sulfide.

A comprehensive review of past and present technology for the removal of sulfur compounds from coal gas is presented. Hydrogen sulfide is identified as the principal compound, constituting 90-95% of the total sulfur. The balance is conventionally but erroneously referred to as organic sulfur. It consists of about 2/3 carbon disulfide and an assortment of thiophenes, mercaptans, thio ethers, organic disulfides, and carbonyl sulfide. The sulfur in coal gas comes from the sulfur in the coal that is carbonized. Removal techniques were originally devised to eliminate the odors associated with the combustion of H2S, followed by recognition of the corrosive properties of sulfur compounds dissolved in water. The current demand for low sulfur coal gas to support an ever increasing number of chemical processes and special metallurgical alloying requirements is forcing the allowable sulfur content in coal gas to continually lower levels. The technology of sulfur removal over the last 150 years is reviewed. The original attempts to use milk of lime resulted in solid deposits and plugging. Scrubbers using solid lime were used a few years later, followed by the use of sulfided lime and then oxide purifiers. Liquid purifiers came on the scene about 1880, using am-

sonic liquor washes, and opening the door to sorbent regeneration. The effects of tar, naphthalene, and hydrocyanic acid, normal constituents of coal gas, on the desulfurization process are discussed. By-product recovery started with converting the sulfur to sulfuric acid, and that process remains today the principal recovery technique. Variations include the recovery of H2S, ammonia, and elemental sulfur. The nature of the recovered product is usually dictated by economic considerations.
APTIC-26211

THE EVALUATION OF THE IGNITION TEMPERATURE OF ACTIVATED CHARCOALS IN AIR, STEAM, OXYGEN AND OXIDES OF NITROGEN.

International Atomic Energy Agency, Vienna (Austria), Symp. on Treatment and Control of Airborne Radioactive Wastes, New York City, 1968, p. 435-447. 20 refs. (Aug. 26-30.)
J. L. Kovach.
Identifiers: *Charcoal, *Combustion, *Temperature, Reactors (nuclear), Operating variables, Adsorption, Simulation, Humidity, Iodine, Nitrogen dioxide (no2), Oxygen, Steam, Radioactive radiation.

The ignition temperature of impregnated and unimpregnated activated charcoals currently used for the adsorption of various forms of radioactive iodine was evaluated. Standardized quartz ignition temperature apparatus was utilized, and the inlet air and charcoal temperatures were increased at a 10 C/min rate until 150 C was reached. After reaching 150 C, the temperature was increased by 5 C/min. Standard rotameters were used to measure gas flow, while the use of multiple rotameters permitted the control of gas concentration to obtain: air at 70% RH at 30 C, air at 100% RH at 75 C, and air-steam mixture where 50% of the available oxygen is in the form of air and the other 50% is introduced as steam, and air bubbled through concentrated nitric acid at 30 C. Atmospheric conditions and gas-charcoal residence times existing in nuclear power reactor containment recirculating filter systems, emergency off-gas filter systems, and fuel reprocessing plant filters were simulated. The ignition of activated charcoals not treated to increase ignition temperature is more likely in low humidity systems or when nitrogen dioxide is present in the air stream. Precautions must be taken if an intermittent air flow is used and if possible, this should be avoided. The presence of large amounts of steam significantly lowers charcoal ignition hazards, while the presence of impregnated iodine increases the ignition temperature. (Author abstract modified)
APTIC-26229

POWER AND INDUSTRY: CONTROL OF NITROGEN OXIDE EMISSIONS.

In: Project Clean Air. California Univ., Berkeley, Task Force 5, Vol. 1, Section 9, 11p., Sept. 1, 1970. 32 refs.
Richard L. Perrine, and Limin Hsueh.
Identifiers: *Excess air, *Nitric oxide (no), *Combustion, Automotive emissions, Stack gases, Chemical processing, Steam plants, Operating variables, Scrubbers, Absorption, Engine design modification, Mathematical modeling, Nitric acid, Catalytic activity, Decomposition, Reduction, Reaction kinetics, Reaction mechanisms, Temperature.

When fossil fuels are burned with air some of the nitrogen reacts with oxygen forming nitrogen oxides; the major source of emissions of NOx in California is motor vehicles, but stationary power sources and others also contribute large quantities. The higher the peak combustion temperature the more nitric oxide is formed. Most current efforts to deal with the problem are centered on developing improved combustion processes and on the design of the burner and type of firing. Some improvement may be obtained through combustion process modifications, but these are constrained by existing designs, stable operating requirements, and adverse secondary effects. Some basic approaches which have been developed for removal of NOx emissions from nitric acid plant stack gases include catalytic decomposition, catalytic reduction, absorption on solids, and caustic scrubbing. A number of modifications to operating conditions or burner design include low excess air combustion, flue gas recirculation, steam and water injection, burner configuration, and fluidized bed composition. The complex interaction of mixing, heat transfer, fluid mechanics, and chemical kinetics within the burner needs to be understood. Simplified models of the combustion process are necessary to aid in the understanding of the critical processes controlling nitric oxide formation and to provide a means for the systematic analysis of cause-effect relationships.
APTIC-26226

POWER AND INDUSTRY: CONTROL OF SULFUR DIOXIDE EMISSIONS.

In: Project Clean Air. California Univ., Berkeley, Task Force 5, Vol. 1, Section 10, 8p., Sept. 1, 1970. 20 refs.
Richard L. Perrine, and Limin Hsueh.
Identifiers: *Fuel oil preparation, *Alkaline additives, Stack gases, Coal characteristics, Fuel oils, By-product recovery, Catalytic oxidation, Coal preparation, Absorption (general), Adsorption (general), Sulfuric acid.

Sulfur dioxide emissions result primarily from the burning of sulfur-containing fossil fuels, and total SO2 emissions to the atmosphere in the U. S. are estimated at more than 23 million tons/year. Large quantities of relatively low-sulfur fuel oils now are available from Indonesia and Alaska, substantially reducing the problem from what it otherwise could be. To date, none of the many direct removal processes appear to be able to break even in terms of recovery of salable by-products: elemental sulfur, sulfuric acid, or ammonium sulfate. Methods to desulfurize oil are available and the only factor is process economics, but coal desulfurization is very difficult. Two basic limestone-dolomite injection processes are being investigated, but the processes give no valuable by-products. Several leaching processes are mentioned, but these have the disadvantage that washing chills stack gases, losing normal buoyancy. Thus reheating is required. High capital and operational costs are involved with absorption and adsorption processes, while the principal need with catalytic oxidation is development to permit effective processing of dilute gases at temperatures lower than presently required. Reduction processes are also cited.
APTIC-26230

POWER AND INDUSTRY: HYDROCARBONS AND OTHER ORGANIC SPECIES.

In: Project Clean Air. California Univ., Berkeley, Task Force 5, Vol. 1, Section 12, 2p., Sept. 1, 1970.
Richard L. Perrine, and Limin Hsueh.
Identifiers: *Solvents, *Adsorption, *Hydrocarbons, Dry cleaning, Petroleum production, Catalytic afterburners, Flame afterburners, Vapor recovery systems, Absorption, Chlorinated hydrocarbons, Condensation, Vapor pressure.

There are many sources of industrial hydrocarbon emissions: petroleum handling and processing, dry cleaning, painting, degreasing, and others. The use of less photochemically reactive or low vapor pressure organic solvents is a useful practice for controlling emissions from small and highly variable sources, such as the painting of buildings. Direct control methods include flame and catalytic afterburners, adsorption, absorption, and condensation. Use of solvents such as in dry cleaning plants gives rise to large total emissions, and many of the chlorinated hydrocarbons used are known health hazards. Closed vapor systems could be developed for such applications, and are needed.
APTIC-26231

POWER AND INDUSTRY: CONTROL OF CARBON MONOXIDE EMISSIONS.

In: Project Clean Air. California Univ., Berkeley, Task Force 5, Vol. 1, Section 13, 2p., Sept. 1, 1970. 6 refs.
Richard L. Perrine, and Limin Hsueh.
Identifiers: *Excess air, *Carbon monoxide, Air quality standards, California, Engine exhausts, Catalytic afterburners, Flame afterburners, Nitrogen oxides.

Carbon monoxide forms during combustion with insufficient oxygen, presenting a problem in the automotive area which contributes about 98% of the total emissions. California ambient air standards allow 20 ppm CO. Approaches proposed for carbon monoxide control include the prevention of CO formation by providing excess air and increased residence time, and removal once formed by flame or catalytic afterburners. One approach toward control of nitrogen oxides, lowering excess air, may increase carbon monoxide.
APTIC-26232

POWER AND INDUSTRY: PARTICULATES.

In: Project Clean Air. California Univ., Berkeley, Task Force 5, Vol. 1, Section 11, 3p., Sept. 1, 1970.
Richard L. Perrine, and Limin Hsueh.
Identifiers: *Particulates, *Electrostatic precipitators, Electric power production, Operating variables, Particle size, Afterburners, Settling chambers, Filters, Wet cyclones.

Industry is the leading producer of particulate emissions, while utility power plants are in second place. However, about 10% of the total airborne particulates result from construction and demolition, which are very difficult to control. Particle size range and the operating basis are cited for settling chambers, cyclones, wet scrubbers, filters, electrostatic precipitators, and afterburners. Precipitators able to operate at high temperatures are currently under development, but further research is needed to develop methods for removal of submicron particles.
APTIC-26233

SPECIAL FEATURES OF THE 140 MW TURBINE OF THE DUISBURG POWER PLANT.

For primary bibliographic entry see Field 01.
APTIC-26237

METHOD FOR THE PRODUCTION OF ELEMENTARY SULFUR FROM GASES CONTAINING HYDROGEN SULFIDE.

(Verfahren zur Herstellung von elementarem Schwefel aus schwefelwasserstoffhaltigen Gasen). Text in German. (Werschen-Weissenfelser Braunkohlen A. G., Halle (East Germany)) Ger. Pat. 514,570. 2p., Dec. 4, 1930. (Appl. May 8, 1928, 1 claim).
Personal Author Not Recorded.
Identifiers: *By-product recovery, *Adsorption (general), Germany, Fuel gases, Hydrogen sulfide, Oxidation.

A method for the production of elementary sulfur is described. The method oxidizes hydrogen sulfide from coal gas by sulfur dioxide adsorbed on a material (semicoke of partly carbonized lignite) possessing a large surface. A container filled with adsorbent material is saturated with a surplus of SO2 whereupon the raw coal gas is passed through the container. The hydrogen sulfide is quantitatively oxidized to sulfur which remains in the adsorbent material from which it can easily be removed by any known method. The purified gas with some SO2 is passed over adsorbent material in another reactor where SO2 is completely adsorbed and the sulfur-free gas can then be used for its intended purpose. When the SO2 in the first reactor drops below a certain concentration the gas stream is switched to a second reactor freshly saturated with SO2. It is advantageous to remove light oil from the gas before desulfurization, then the adsorbent material can be used over and over again.

APTIC-26238

DUST AS RAW MATERIAL AS A SOURCE OF LOSS AND OF GAIN.

For primary bibliographic entry see Field 10.
APTIC-26239

METHOD FOR PROCESSING LYE OBTAINED FROM THE SCRUBBING WITH AMMONIA OF GASES CONTAINING SULFUR DIOXIDE AND POSSIBLY SULFUR TRIOXIDE.

(Werkwijze voor het opwerken van wasloog, verkregen bij het wassen van zwaveldioxyde en eventueel zwaveltrioxyde bevattende gassen met ammoniak). Text in Dutch. (Chemiebau Dr. A. Zieren G.m.b.H., Keulen (West Germany)) Dutch Pat. 6,413,795. 8p., June 4, 1965. (Appl. Nov. 27, 1964, 5 claims).
Personal Author Not Recorded.
Identifiers: *Scrubbers, *By-product recovery, *So2 removal (combustion products), Europe, Ammonium compounds, Sulfates.

The wash water derived from the reaction of ammonia with gases containing the sulfur oxides contains ammonium sulfate, ammonium bisulfate, and small quantities of ammonium thiosulfate and ammonium trithionate. The recovery of ammonia and sulfur dioxide from this solution is accomplished by adding a mixture of an alkaline sulfate and an alkaline bisulfate, which drives the sulfur dioxide out of the solution. The resulting solution is evaporated, condensed and the resulting salt separated from the liquid phase. The salt is heated to about 400 C, with a recommended use of steam, until practically all of the ammonia has been driven off. Enough bisulfate is then added to the residue to establish the same ratio of bisulfate to sulfate that occurred in the first step of the process, making it possible to complete the chemical cycle.
APTIC-26240

DESULFURIZATION OF LARGE QUANTITIES OF GAS.

(Die Entschweflung grosser Gasmengen). Text in German. Gas Wasserfach, 69 (7):125-128, Feb. 13, 1926. 5 refs.
A. Thau.
Identifiers: *So2 removal (combustion products), Germany, Design criteria, Iron oxides, Reaction mechanisms.

Raffloer's method desulfurizes large quantities of gas in towers which the gas enters at the top, encountering a countercurrent stream of iron oxide particles blown in by a ventilator through a jet. The intimate contact thus achieved desulfurizes the gas completely. The iron oxide purification mass is used until its sulfur content reaches 70%, at which time it is discharged without the need of regeneration. The iron oxide should have a water content of about 0.7% for best results. The lux mass with a normally 40-50% water content which is commercially available thus must be dried, which involves an expense and is the only drawback of the method. The gas from the reaction tower is, in a second tower, deprived of suspended iron oxide particles by passing through a layer of iron oxide. One cu m purification mass will desulfurize 50,000 cu m gas. The pulverizer ventilator requires a 5 HP motor. Operating costs involve the wages of a single part-time operator.
APTIC-26242

IMPROVED PROCEDURE FOR PURIFYING THE EXHAUST OF INTERNAL COMBUSTION MOTORS.

(Procede perfectionne de purification des gaz d'echappement des moteurs a combustion interne). Text in French. (American Cyanamid Company, New York) French Pat. 1,539,444. 5p., Sept. 13, 1968. (Appl. Oct. 4, 1967, 5 claims).
Stephen Fred Adler, and Robert Murphy Yarrington.
Identifiers: *Tetraethyl lead, *Automotive emission control, *Catalytic afterburners, France, Engine exhausts, Internal combustion engines, Design criteria, Potassium compounds, Vanadium compounds, Sulfur dioxide, Silicon compounds, Sulfates, Catalysts, Reaction mechanisms.

The elimination of lead products from the exhaust of gasoline motors is improved by means of prolonging the life of the lead-sensitive catalyst. This is accomplished by providing another catalyst, which promotes the formation of sulfur dioxide from the other oxides of sulfur present in the exhaust. The sulfur dioxide then reacts with the volatile lead compounds to form less volatile compounds, after which the exhaust gases are brought in contact with a purifying catalyst which converts the products of incomplete combustion into carbon dioxide and water. A preferred formula for the first catalyst is a mixture of 7-9% vanadium oxides, 10-15% potassium oxides, 20-30% of a substance yielding sulfate ions, and a silicon base. The vanadium can be replaced by other noble metals, and any pyrosulfate of an alkali metal can be used, provided it melts at a reasonably low temperature.
APTIC-26243

NEW PENNSALT HF PLANT.

Chem. Ind., vol. 66:508-509, 1950.
Herman W. Zabel.
Identifiers: *Fumes, *Scrubbers, *Hydrofluoric acid, Chemical processing, Water.

Use of reduced pressure in process equipment and thorough scrubbing with water has resulted in the successful control of fumes at a plant where hydrogen fluoride is formed in rotary kilns by the reaction of fluorspar with sulfuric acid. As a first step in HF purification, gas from the kilns is passed to coke-packed towers. These catch spar dust, entrained sulfuric acid, and some moisture condensates. The gas then goes to a surface cooler, after which it is liquefied in a two-stage steel condensor, the first water cooled and the second brine cooled. The gas from this condensor is scrubbed with water to absorb the last traces of hydrofluroic and hydrofluosilic acids. Before the exit gas is vented to the atmosphere, additional scrubbbing takes place in a water injector, which also serves to maintain a small negative pressure on the system. Thus all leakage is inward and no HF or hydrofluosilic fumes can escape to the atmosphere.
APTIC-26244

A PROCESS FOR REMOVING SULPHUR DIOXIDE FROM WASTE GASES.

(Assignee not given.) Brit. Pat. 1,181,703. 6p., Feb. 18, 1970. (Appl. March 28, 1967, 8 claims).
Jaroslav Derka, and Vladimir Veverka.
Identifiers: *Absorption (general), *Alkaline additives, Czechoslovakia, Combustion gases, Ammonium compounds, Sulfates, Sulfites.

A process is described for removing sulfur dioxide from waste gases, which comprises absorption with an aqueous ammonium sulfite-bisulfite solution. The SO2-containing aqueous solution is heated to produce a gaseous steam/SO2 mixture and a residual solution. Next, the ammonium sulfate is removed from the residual solution to produce a regenerated solution which is used in the first absorption stage. The waste gases from the first absorption stage are treated in a second absorption stage with an aqueous ammoniacal solution to form the ammonium sulfite-bisulfite solution which is used in the first stage.
APTIC-26246

REMOVAL OF SULFUR DIOXIDE FROM STACK GASES BY SEA WATER.

In: Project Clean Air, Vol. 1. California Univ., Berkeley, Dept. of Chemical Engineering and California Univ., Berkeley, Bodea Marine Lab., California Univ., Research Proj. 5-15, 41p., Sept. 1, 1970. 48 refs.
L. A. Bromley, and S. M. Read.
Identifiers: *Oceans, *Spray towers, *Absorption (general), Stack gases, Packed towers, Nitrogen oxides, Sulfates, Water, Ph.

That sulfur dioxide can be effectively scrubbed from stack gas by sea water has been conclusively demonstrated by theoretical calculations and by experimental work. The amount of sea water required for a single stage absorber operating on a typical, power plant flue gas, produced by the burning of fuel oil, is about 25 lbs sea water/lb of stack gas. This is comparable with the amount of cooling water used by power companies. Based on limited experiments, this will easily remove 90% of the SO2 in a simple spray absorber and produce a brine effluent of pH near 6. Even 99% removal (or 99.9%) is easily attained with a short (5') packed column. An air spraying, bubbling or other oxygen addition will probably be required to obtain the necessary dissolved oxygen level in the effuent sea water before returning it to the ocean. All of the dissolved SO2 will become harmless sulfate. The sulfate concentration in the sea water is increased less than 10%. This is far from saturation. The resulting sea water should have no undesirable effect on marine life. By using several counter-current absorbing stages or plates, or a packed or fluidized bed absorption tower, the sea water required may be reduced by about a factor of 5 although the brine produced will have a pH between 2 and 3 and will require dilution or neutraliza-tion an aeration before its return to the ocean. Spraying over or bubbbling air through sea water containing oyster shells or limestone would be a possible way to accomplish both neutralization and aeration. This, however, should be tested. Several authors have reported that from 1/4 to 1/2 of the oxides of nitrogen are removed from flue gas by such aqueous scrubbing. From an economic point of view the most attractive solution appears to be the combination of this method of air pollution control with the sea water pretreatment for a sea water conversion facility. The 5 to 10% reduction in the cost of converted water (from a projected large scale plant) by elimination of the usual sulfuric acid addition could be applied to the charges for pollution control and warrants further investigation. Because the absence of SO2 allows for the use of a cheap fuel oil in place of natural gas, any inexpensive SO2 removal process should appear attractive to the utility companies. The use of fuel oil would also help conserve companies. The use of oil would also help conserve our more limited natural resources. (Author abstract modified)
APTIC-26248

MISCELLANEOUS INDUSTRIAL EMISSIONS.

For primary bibliographic entry see Field 01.
APTIC-26254

AIR POLLUTION CAUSED BY AGRICULTURE, FORESTRY AND THE FOREST PRODUCTS INDUSTRIES: COMBUSTION.

In: Project Clean Air. California Univ., Berkeley, Task Force 5, Vol. 1, Section 4, 19p., Sept. 1, 1970. 51 refs.
Victor P. Osterli.
Identifiers: *Open burning, *Solid waste disposal, Wood, Farms, Paper manufacturing, Hydrocarbons, Inversion.

To suddenly eliminate agricultural, forest land, and wood residue burning because it is a socially undesirable practice related to air pollution will necessitate development of satisfactory, economical, and practical alternatives. In some instances, burning has also destroyed disease, insect, and weed pests. The average daily contribution of air pollutants from agricultural burning throughout California is less than 56 tons of hydrocarbons per day, but the concentration of the pollution at certain times of the year, in certain localities, and during periods of poor ventilation presents a problem. Agriculture in some county air pollution control districts permits burning only when the inversion base and the maximum mixing height are at prescribed levels and specified wind velocities oc-

cur. Problems of controlled burning must be considered in the light of the benefits of open areas created within brush fields by the range improvement program. This involves the use of fire for the removal of 'less desirable' woody vegetation followed by reseeding with forage species to provide more feed of better quality for cattle. Alternative methods of disposal are especially needed for the burning of residual waste from sawmills and wood processing mills. The incorporation of residues into the soil by farm operations should be encouraged, while shredding followed by discing is useful for the disposal of logging wastes. Herbicides have to a large extent replaced open burning along ditchbanks, roadsides, and around farm headquarter. In the instance of wood residuals, they are finding increased utilization by their conversion to chips to be used to wood pulping and particle board manufacturing. Pest problems, economic factors, and the search for alternatives are discussed. Short-term and long-term research needs are mentioned, as well as research in forest waste management.
APTIC-26255

ELECTROSTATIC PRECIPITATOR.

(Hitachi, Ltd., Tokyo (Japan)) Brit. Pat.
1,073,901. 5p., June 28, 1967. (Appl. Sept. 14, 1964, 3 claims).
Chohei Kobayashi, Haruyuki Kusagaya, and Bunzo Ando.
Identifiers: *Design criteria, *Electrostatic precipitators, Japan, Dusts, Ionization, Electrical properties.

An electrostatic precipitator is described which comprises an ionizing section in which dust particles contained in air are electrified and a collecting section in which the electrified dust particles are precipitated. The ionizing section is composed of a plurality of grounded electrodes arranged parallel to the direction of the air stream and spaced from each other. Ionizing filaments extend transversely to the air stream, lying between the grounded electrodes and the auxiliary electrodes. Compared with the ionizing filaments, the auxiliary electrodes are thick. Each of the auxiliary electrodes, essentially nondischarging, are disposed parallel to an adjacent ionizing filament. They are maintained at substantially the same potential as the ionizing filaments and placed to materially effect the electric field formed between the ionizing filaments and the grounded electrodes. Thus, the precipitating efficiency is improved by intensifying the electric field without raising the ionized current.
APTIC-26265

ALDEHYDES, POLYNUCLEAR AROMATIC HYDROCARBONS, AND ATMOSPHERIC LEAD.

In: Project Clean Air. California Univ., Berkeley, Task Force No. 7, Section 5, 4p., Sept. 1, 1970. 7 refs.
J. N. Pitts Jr.
Identifiers: *Automotive emissions, *Engine operation modification, Synergism, Carcinogens, Smog, Air-fuel ratio, Spark timing, Fuel additives, Aldehydes, Aromatic hydrocarbons, Polynuclear compounds, Lead compounds, Photochemical reactions.

Aldehydes, aromatic compounds, and lead compounds in automobile exhaust are discussed with reference to their photochemical reactivities. Aldehydes are far more reactive than aromatic hydrocarbons and constitute a noteworthy portion of exhaust. Lowering hydrocarbon emissions by increasing air-fuel ratio alone could result in substantial increases in aldehydes, but compromises in mixture ratio and spark timing would probably produce parallel reductions of both aldehydes and hydrocarbons. Removal of lead additives from gasoline with concommitant increases in monocyclic aromatic compounds might lead to an increase in polynuclear compounds and also increased photochemical reactivity of exhaust. While neither polynuclear compounds nor aldehydes are presently associated with health problems, the former have carcinogenic properties and the latter may play a synergistic or antagonistic role in tumor induction. When irradiated, certain inorganic compounds produced by leaded fuels may produce lead oxides that in turn catalyze or photosensitize the oxidation of gaseous pollutants. Aspects of smog chemistry requiring additional research are noted.
APTIC-26269

PROCESS FOR REMOVING SULPHUR DIOXIDE FROM A GAS.

(Lummus Co., Bloomfield, N. J.) Brit. Pat.
1,160,197. 5p., July 30, 1969. (Appl. April 23, 1968, 13 claims).
Personal Author Not Recorded.
Identifiers: *By-product recovery, *Absorption (general), *Sulfur oxides, United states, Combustion gases, Carbonates, Temperature.

Many processes, including absorption techniques, have been derived for removing sulfur dioxide, and sulfur trioxide from gases such as smelter gases, flue gases, off gases from chemical processes, and stack gases from coal-burning furnaces. However, most of these processes are ineffectual with low concentrations of sulfur oxides and do not provide for the recovery of sulfur values or for the regeneration of the absorption material. The process reported is extremely effective for removing quantities of sulfur oxides as low as 0.15%. It entails reacting sulfur dioxide with a metal carbonate, preferably sodium or calcium carbonate, or dolomite to produce a metal sulfite. The sulfite is then reduced with carbon monoxide to regenerate the carbonate, to recover sulfur values, and to produce carbon dioxide. The latter is reduced with a free carbon-containing material to regenerate the carbon monoxide. Preferred temperatures for the gas-carbonate contact are 250 to 1000 F; preferred temperatures for the reduction of the sulfite are 1000 to 1800 F.
APTIC-26272

GAS SCRUBBING IN THE HYDRODYNAMIC DUST SEPARATOR DURING ELECTROLYSIS OF ALUMINUM.

Soviet J. Non Ferrous Metals (English translation from Russian of: Tsvetn. Metal.), 9 (12):68-70, Dec. 1968. 3 refs.
V. A. Kozlov, and N. A. Tyurin.
Identifiers: *Hydrodynamic dust separators, *Aluminum, *Dusts, *Electrolysis, Ussr, Chemical processing, Operating variables, Pilot plants, Scrubbers, Fluorine compounds.

Design and operating data are given for a pilot hydrodynamic dust separator for treating fluorine compounds, dust, and resinous matter produced during aluminum electrolysis. The dust separator is a vertical chamber 3.1 m high and provided with two symmetrically located air scrubbing channels. The hydraulic resistance of the separator is 115 mm H2O with an optimum flow velocity of 19 m/sec. Gaseous fluorine is collected with 98% efficiency, dust with 73.2-77.7% efficiency, and resinous matter with 35-73% efficiency.
APTIC-26279

PERFORMANCE TEST METHOD FOR VENTILATOR/AIR PURIFIER (FOR DELETERIOUS GAS), DRAFT.

(Kankiyo kuki seijoki (yugai gasuyo) no seino shikenho (an)). Text in Japanese. Kuki Seijo (Clean Air-J. Japan Air Cleaning Assoc., Tokyo), 8 (6):57-66, Dec. 1970.
Personal Author Not Recorded.
Identifiers: *Control equipment, *Adsorption, Equipment standards, Charcoal, Japan, Combustion gases, Colorimetry, Electroconductivity analyzers, Ventilation, Design criteria, Infrared spectrometry, Carbon monoxide, Sulfur dioxide, Hydrogen sulfide, Flow rates, Density.

Performance tests are specified for ventilator/air purifiers for harmful gases; the purifiers are defined as those with activated charcoal or a similar removal agent and with sectional areas 500 by 500 mm or 610 by 610 mm. Performance factors to be measured include pressure loss, initial gas removal efficiency, and gas adsorption capacity. Design components of a suitable measuring instrument are noted: the test apparatus should be such that the density of the test gas can be held uniform and gas flow regulated. Test instructions clearly specify the density of the test gas: 20 plus or minus 2 ppm for sulfur dioxide, 20 plus or minus 2 ppm for hydrogen sulfide, and 100 plus or minus 10 for carbon monoxide. In testing initial gas removal efficiency, the Rosaniline and solution conductivity methods, or continuous measurement methods can be used to determine sulfur dioxide density. The Methylene Blue method is suggested for hydrogen sulfide density and infrared analysis for carbon monoxide density. In testing pressure loss, total pressure difference between the entrance and exit of the air purifier at specified wind velocity is measured by designated pressure gauges. Gas adsorption capacity is determined by repeating the gas removal efficiency test until efficiency drops below 85%.
APTIC-26295

TOSHIBA ELECTROSTATIC AIR FILTER.

(Toshiba kuki seijoki). Text in Japanese. Toshiba Rebyu (Toshiba Rev.), 24 (1):100-106, Jan. 1969. 7 refs.
Hisashi Okatsuka, and Tomizo Honma.
Identifiers: *Electrostatic precipitators, Japan, Dusts, Particle size, Odor counteraction, Design criteria, Ionization, Corona.

An effective method utilizing static electricity is described which removes dust in the atmosphere. By covering the positive plates with an insulator, the negatively charged plates can be brought within a distance of 1.5 to 2.5 mm to the positively charges plates, thus increasing their adhesive force. The apparatus comprises a filter, an ionizing section, a precipitator, a deodorization filter, and a cation generator. The first filter collects the comparatively large particles more than 5 micron in diameter. An ionizing section, which is formed by several grounded metal plates placed parallel to the air flow and by tungsten wires placed between the plates, generates a small amount of injurious gases such as ozone and nitrogen dioxide. The small distance between the negative and positive bands results in low voltage between them during operation and improves the collection efficiency and spark noise. An activated carbon deodorization filter effectively removes the injurous gases. The cation generator utilizes a method of corona discharge, while reflected light from the wall of the ionizing section is included to reduce dust accumulation. A removal efficiency of 95% can be achieved, while the smallest particles which can be removed are 0.01 micron in diameter. The number of filter units to be installed can be determined by the use of a chart and a dust meter.
APTIC-26296

ESTIMATION FOR INITIAL COLLECTION EFFICIENCY OF A FIBROUS MAT FILTER.

(Seni jutenso firuta no shoki hoshu koritsu ni taisuru ichi suiteiho). Text in Japanese. Kagaku Kogaku (Chem. Eng.), 33 (12): 1248-1254, Dec. 1969. 16 refs.
Norio Kimura.
Identifiers: *Operating variables, *Filter fabrics, Textiles, Japan, Filters, Inertial separation, Mathematical analyses, Diffusion, Electrical properties.

Experiments were conducted to determine the effect of fiber material on the collection efficiency of fibrous mat filters, and an equation was developed that gives the collection efficiency of several kinds of fibers. Under arbitrary conditions, the total collection efficiency of a fibrous mat filter is influenced by inertia, interception, dif-

fusion, and static electricity. The experiments involved the collection of DOP aerosols by glass fibers, cotton fibers, kanekalon (with noncircular intersections), wool fibers, and nine kinds of synthetic fibers (one with circular intersections). Experimental formulas for a single fiber in both the condition of (Psi/psi c l: inertia range) and (Psi/psi r l: diffusion range) consider the minimum collection efficiency of a single filter and the corresponding inertia parameter below which no inertial impact occurs (Psi c). The minimum collection efficiency of a single fiber is given by a Z number as the ratio of collection efficiency of an isolated fiber by interception; for a glass fiber it is the function of the Peclet number which is concerned with superficial face velocity at maximum penetration determined by Psi c. The correction of Z and the Peclet number can be given for any fiber, but the Z number differs according to fibrous material at low Peclet numbers. This is considered to be the result of electrostatic collection effects. The Z number of each fiber is arranged according to order of electrification. The Z value for high Peclet numbers tends to agree with that of glass wool.
APTIC-26301

REMOVAL OF ODOR OF ORGANIC SOLVENT AND UTILIZATION OF RECOVERED HEAT BY U.O.P. CATALYTIC COMBUSTION SYSTEM.

(Sesshoku sanka shokubai sochi ni yoru yuki yozai shuki jokyo to kaishu netsu riyo ni tsuite). Text in Japanese. Akushu no Kenkyu (Odor Research J. Japan), 1 (3):45-53, Oct. 1970.
T. Endo, and T. Okazaki.
Identifiers: *Solvents, *Catalytic afterburners, *Odor counteraction, Japan, Fumes, By-product recovery, Catalytic oxidation, Design criteria, Heat transfer, Temperature.

The U.O.P. catalytic combustion system is utilized for counteracting odors, while also recovering heat to economic advantage. It features a catalytic element made of platinum and a combustion system which preheats the gas to be treated up to the temperature at which catalysis occurs. After eliminating the odor, the gas is recycled. Examples are included for a metal printing and automobile painting factory. There are a number of variations in the system, such as the use of oxidized ethylene or nitric acid equipment. In these cases, the exhaust gas which was passed through the catalytic element in a high pressure vessel is transmitted to a gas turbine and utilized for generation at the plant. At the enamel baking furnace, color iron sheet baking furnace, or canning sheet printing furnace, the remainder of the exhaust gas which contains solvent fumes is preheated before being passed through the catalytic element and returned to the heat generation furnace, economizing fuel. Low concentrations of gas can be oxidized at 260 to 350 C, with the fuel cost about 1/3 of the direct combustion method. The element can easily be detached for maintenance.
APTIC-26308

3. MEASUREMENT METHODS

AIR POLLUTION INSTRUMENTATION. STATE OF THE ART.

Preprint, National Air Pollution Control Administration, Washington, D. C., Methods Development Section, 23p., 1968 (*). (Presented at the American Council of Independent Laboratories, Inc., Annual Meeting, Washington, D. C., Oct. 20, 1968.)
Andrew E. O'Keeffe.
Identifiers: *Analytical methods, *Measurement methods, Fluorescence, Mists, Potentiometric methods, Flame ionization detector, Spectrophotometry, Electroconductivity analyzers, Photometric methods, Mass spectrometry, Sulfuric acid, Methanes, Carbon monoxide, Sulfur dioxide, Sulfur trioxide, Ozone.

Brief descriptions of a number of new air pollution monitoring instruments being developed are presented. A key feature of these devices is their ability to sense and measure pollutants without use of reagents in solution. A flame photometric sulfur detector is being modified to read sulfur dioxide by gas chromatography. Fuel cells can be made for burning carbon monoxide, methane, SO2, or other compounds of interest. Semiconductors, such as zinc oxide, change resistance when exposed to certain compounds. Microwave plasma detectors, in conjunction with spectrophotometers, can analyze certain gases. A chemiluminescent ozone monitor can measure ozone due to a release of light energy in direct proportion to the partial pressure of ozone. The permeation tube primary standard emits a constant supply of a desired gas, a feature which makes it desirable as a standard. Variations of gas chromatography and mass spectrometry are discussed. A system for the analysis of sulfur trioxide (sulfuric acid mist) is described. Not all of these methods will necessarily be commercial successes, but a number of them will certainly prove to be of great value in the detection of air pollutants.
APTIC-12596

OBSERVATIONS ON THE THEORY OF JET IMPACTORS.

(Bemerkungen zur Theorie der Duesen-Impaktoren). Atmos. Environ., vol. 3:69-83, 1969. 15 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 25p., July 23, 1969.
Gottfried Haenel.
Identifiers: *Jet impactors, Germany, Aerosols, Particle shape, Particle size, Samplers, Calibration methods, Mathematical analyses.

Jet impactors are often used as collecting instruments to measure the distribution and the characteristics of atmospheric aerosol particles. The usual theory of jet impactors is valid only for spherical particles at low Reynolds numbers. Application of this theory to non-spherical aerosol particles in jet impactors is not possible exactly. The impactor theory was modified based on the equation of motion of non-spherical particles at conditions occurring in jet impactors, making it possible to explain the differences between the impactor calibrations of RANZ and WONG (1952) and of STERN et al (1962). Calculations on the influence of particle shape and density on the impactation process show that jet impactors and other sampling instruments based upon the inertia principle are not capable of measuring the size and the number of atmospheric aerosol particles in absolute terms. (Author abstract modified)
APTIC-12836

SURFACE COLLECTION EFFICIENCY OF LARGE-PORE MEMBRANE FILTERS.

Health Phys., vol. 10:495-499, 1964. 5 refs.
C. L. Lindeken, F. K. Petrock, W. A. Phillips, and R. D. Taylor.
Identifiers: *Isotopes, *Alpha particles, *Membrane filters, Continuous monitoring, Filters, Experimental equipment, Plutonium compounds.

A solid-state, continuous, plutonium-alpha air monitor required a filter with high surface-collection efficiency to permit the detector to resolve between the alpha energy of plutonium-239 and that of the natural alpha background. Because the resistance of submicron membrane filters to air flow was too high for constant-flow sampling rates to be maintained, the surface-collection efficiency of large-pore membrane filters was investigated. Membrane filters with pore diameters from 0.5 to 10 microns were evaluated by collecting the airborne radon daughter products on a filter and measuring the energy resolutions at the 7.68 MeV RaC' activity. Compared with the submicron filters, the large-pore membrane filters showed no serious sacrifices in collection efficiency until the pore diameters exceeded 5 microns. Since these filters provide greater air flow at a given pressure differential than submicron filters, they appear suitable for sampling airborne alpha-emitting radioisotopes.
APTIC-22169

EFFICIENCY OF IPC-1478 FILTER PAPER AGAINST POLYSTYRENE LATEX AND DIOCTYL PHTHALATE AEROSOLS.

Los Alamos Scientific Lab., N. Mex., Contract W-7405-ENG. 36, Rept. LA-4356, 11p., May 1970. 7 refs.
Ronald G. Stafford, and Harry J. Ettinger.
Identifiers: *Ipc-1478 filter paper, *Aerosols, *Membrane filters, Particle size, Membrane, Experimental equipment, Liquids, Solids.

IPC-1478 filter paper efficiency was evaluated using polystyrene latex and dioctyl phthalate aerosols. Efficiency was measured as a function of particle size, filtration velocity, and filter mass loading. Experimental results for 0.557 micrometers and larger particle sizes indicate that this medium has limited effectiveness under high-velocity and high-loading conditions. Differences in efficiency were observed when this medium was tested with solid and liquid aerosols. (Author abstract modified)
APTIC-22190

AUTOMATIC ANALYSIS OF GASEOUS IMPURITIES IN THE ATMOSPHERE.

(Samocinne amaluzatory plynnych necistot v ovzdusi). Ochrana Ovzdusi, 1969:129-135, Sept. Translated from Czech. Belov and Associates, Denver, Colo., 23p.
T. Bartovsky.
Identifiers: *Analytical methods, Czechoslovakia, Flame ionization detector, Automatic methods, Photometric methods, Instrumentation, Ammonia, Hydrocarbons, Carbon dioxide, Carbon monoxide, Nitrogen oxides, Sulfur dioxide, Hydrogen sulfide.

Tables are presented which show a summary of the current developments in automatic analyzing instruments used for concentrations of pollutants in the atmosphere or in industrial stack gases. The list of manufacturers is based on the principle on which the function of the instrument is based. Instruments based on absorption of infrared radiation can be used to measure carbon monoxide and dioxide, nitrogen oxides, ammonia, sulfur dioxide, hydrogen chloride, and hydrocarbons. For determining very low concentrations of compounds in gas mixtures, a combination of photometric analysis and the reaction of the gas and liquid is used. Instruments based on the electrolytic conductivity change of liquids after reaction with glass are also suitable for measuring low concentrations in gas mixtures. Depolarization and polarographic instruments use the electrochemical reaction on the polarized electrode immersed in the liquid. In coulometric instruments, the compounds are electrolytically oxidized with bromine or iodine. This method is used to measure SO2, hydrogen sulfide, mercaptans, thiophenes, thioethers, organic sulfides, and olefins. For measuring high concentrations, the election of instruments for each compound is broad and the selection of the most suitable instrument depends on other conditions, especially on the type of other impurities.
APTIC-22220

CALIBRATION OF A TWO-STAGE AIR SAMPLER.

California Univ., Los Alamos Scientific Lab., N. Mex., AEC Contract W-7405-ENG. 36, 7p., Aug. 1969. 22 refs. CFSTI: LA-4234
Harry J. Ettinger, and George W. Royer.
Identifiers: *Dusts, *Samplers, *Calibration methods, Particle size, Centrifugal separators, Glass fabrics, Aerodynamics, Flow rates.

Several criteria defining maximum safe air concentrations for occupational exposure are based on the quantity of contaminant that penetrates into the lower lung. This is defined as the respirable dust. A two stage sampler consisting of a cyclone sampler followed by a high-efficiency filter will approximate the respirable dust curve if the proper

flow rate is chosen. A two-stage sampler consisting of a nylon cyclone, followed by a glass fiber filter was calibrated using monodisperse test aerosols. Cyclone efficiency, as a function of sampling flow rate, and aerosol aerodynamic diameter were determined. At a flow rate of 1.7 liters/min, this sampler provides a good estimate of 'respirable dust' concentration. (Author abstract modified)
APTIC-22722

LITERATURE REVIEW OF METROPOLITAN AIR POLLUTANT CONCENTRATIONS—PREPARATION, SAMPLING AND ASSAY OF SYNTHETIC ATMOSPHERES. (FINAL REPORT).

Stanford Research Inst., Menlo Park, Calif.,
Contract DA 18-064-404-CML-123, S.R.I. Proj.
SU-1816, 193p., Nov. 30, 1956. 82 refs.
H. C. Wohlers, and G. B. Bell.
Identifiers: *Controlled atmospheres, *Analytical methods, Urban areas, Automotive emissions, Stack gases, Bacteria, Particulates, Coal, Natural gas, Fuel oils, Electric power production, Incineration, Primary metallurgical processing, Dust fall, Electrochemical methods, Iodimetric methods, Saltzman method, Spectrophotometry, Hi-vol samplers, Impingers, Membrane filters, Glass fabrics, Ultraviolet spectrometry, Hydrofluoric acid, Formaldehydes, Ammonia, Fluorides, Chlorine, Fluorine, Hydrocarbons, Carbon dioxide, Carbon monoxide, Nitrogen dioxide (no2), Sulfur dioxide, Ozone, Hydrogen sulfide.

A literature review of metropolitan air pollutant concentrations and of the preparation, sampling, and assay of synthetic atmospheres is presented. Measured concentrations of gaseous and particulate pollutants in the atmosphere, including sulfur dioxide, hydrogen sulfide, nitrogen dioxide, ammonia, formaldehyde, hydrocarbons, chloride, carbon monoxide, ozone, fluoride, hydrogen fluoride, carbon dioxide, gross particulates, and dust fall are tabulated. Calculated emissions from centers of population are presented for industrial and public processes, including combustion of coal, oil, and natural gas, incinerators, automobile exhausts, power plants, and metallurgical operations. Data on measured and calculated air pollution concentrations throughout the world are given. Methods for injecting pollution simulants into a test chamber, such as ozone generators and aerosol despensers, are mentioned. Sampling and analytical procedures are described for the particular problem of testing static atmospheres for bacteria. Sampling equipment consists primarily of an impinger preceded by a millipore filter. Analytical procedures include ultraviolet absorption, high volume sampling, glass fiber filters, and colorimetric, gravimetric, iodimetric, spectrophotometric, Saltzman, and electrochemical methods.
APTIC-22812

STATUS REPORT.

Wyoming Univ., Laramie, Dept. of Physics,
NASA Grant NGR 51-001-020, 23p., 1970. 3 refs.
CFSTI: N70-12719
Edgar A. Rinehart.
Identifiers: *Spectrometry, *Gases, Pressure.

According to Harrington's theory of saturated intensity coefficients; the curve of 'Intensity' (spectrometer signal) vs. incident power will have the same shape independent of molecular species or specific transition. This saturation approach was experimentally verified in the present work on microwave spectroscopic analysis of polar gases in gaseous mixtures. The spectrometer signal was a linear function of partial pressure of the absorber over a pressure range above 3.5 mtorr for pure gases. For gases of much higher dilution, the linear range extends to much lower pressures. A straightforward technique, based on slope ratios, was developed for determining concentrations. A less straightforward method, based on signal measurements only, was also devised. Accurate partial pressure measurements of individual components in a gaseous mixture is feasible, but the amount of data which could be made available from measurements on many compounds is too large to collect under manual operation and recording. Operation under control of a small computer is required. Future measurements of the sulfur dioxide content of selected air samples will provide a test of the methods reported for very small quantities of polar constituents of a mixture of gases. Concentrations in the ppm range are easily determined, and the ultimate sensitivity appears to be several ppb.
APTIC-23503

DAYTIME TRACKING OF A HIGH-ALTITUDE VAPOR TRAIL.

J. Atmospheric Sci., 27 (6):979-980, Sept. 1970. 2 refs.
Gordon T. Best.
Identifiers: *Radiation measuring systems, *Design criteria, *Vapors, Missels and rockets, Experimental equipment, Lithium compounds.

In a comparative analysis of several alternative systems for daylight tracking of vapor trails, it was determined that a useful instrument could be realized by building differential radiometer which would compare the signal from a small field of view in two narrow adjacent spectral regions, only one of which contained the spectral emission feature of the vapor trail. The advantage of the radiometer technique is that detection depends not only on the ratio of feature to background intensity, but rather on the ratio of the square of the feature intensity to the product of the background intensity and the electronic bandwidth of the system. Using commercially fabricated interference filters of 2.5 A half-width, a simple instrument of this type was built. The solid angular field at the filter was 0.01 rad diameter, determined by the spatial resolution required in object space. By adding an afocal telephoto system, it is possible to achieve at least a ten-fold increase in throughput with a consequent three-fold gain in signal-to-noise ratio, without significantly degrading the spectral resolution. The instrument was set up at Tyndall AFB, some 120 km to the east of the launch site at Eglin AFB, and used to track a trail of lithium vapor from a Nike-Iriquois rocket.
APTIC-23591

THE NEW YORK STATE CONTINUOUS AIR QUALITY MONITORING SYSTEM.

New York State Dept. of Health, Albany, Div. of
Air Resources, Rept. BARD-2, 11p., Jan. 27, 1969.
7 refs.
Donald E. Gower.
Identifiers: *Air quality measurement programs, *New york state, *Continuous monitoring, Survey methods, Alerts, Air resource management, State governments, Oxidants, Soiling index, Flame ionization detector, Colorimetry, Samplers, Computers, Data handling systems, Winds, Humidity, Rain, Snow, Pressure (atmospheric), Temperature (atmospheric), Aldehydes, Hydrocarbons, Carbon monoxide, Nitric oxide (no), Nitrogen dioxide (no2), Sulfur dioxide.

The State of New York is among the first to install and operate a Continuous Air Quality Monitoring System for measurement of eighteen air pollution parameters over the large geographical area encompassed by the State. The objective of the system is to aid the New York State Department of Health's Division of Air Resources in managing and improving the air environment to protect the people's health. This objective will be achieved by continuously monitoring the State's air parameters and providing reports which will be used to determine the air quality level. For instance, the monitoring system provides data that is used to evaluate the status criteria for the 'High Air Pollution Alert and Warning System'. Each monitoring station sends data to the central office computer every fifteen minutes by telephone lines. The collected data will be processed by computer and visually displayed for use at a report rate which is 'effectively real time'. At present, ten monitoring stations are becoming operational and provide valuable air quality data. Expansion of this system to fifty stations is planned over the next few years. The latest advances in air pollution instrumentation, electronic data transfer, and data processing techniques used in the Continuous Monitoring System are discussed in detail. Particular emphasis is placed on the electronic systems and techniques that play a vital role in today's environmental engineering programs. Sulfur dioxide, nitric oxide, nitrogen dioxide, aldehydes, and oxidants are detected by colorimetric methods. Carbon monoxide is sensed by infrared absorption. The concentration of hydrocarbons is determined by the flame ionization method. Meteorological data, include wind speed, radiation, pressure, humidity, temperature, rain, and snowfall are also obtained. Soiling is measured by a papertape sampler. (Author abstract modified)
APTIC-23762

FEASIBILITY OF TUNNEL DETECTION BY TRACE GAS ANALYSIS.

Army Cold Regions Research and Engineering
Lab., Hanover, N. H., DA Task 1J662708A46206.
SR-148, 8p., June 1970. 13 refs. NTIS, DDC:
AD708861
R. P. Murrmann, D. C. Leggett, and T. F. Jenkins.
Identifiers: *Tunnels, *Trace analysis, Alaska, Gas chromatography, Meteorological instruments, Mass spectrometry, Winds, Humidity, Pressure (atmospheric), Temperature (atmospheric).

The feasibility of tunnel detection by trace gas analysis was investigated at the Cold Regions Research and Engineering Laboratory permafrost tunnel near Fox, Alaska. Micrometeorological measurements were made to determine the relationship between the direction and speed of air movement in and out of the tunnel, and variations in meteorological conditions. Microbarographs to measure pressure, and hygrothermographs to measure relative humidity and temperature were installed inside the tunnel and outside near the entrance and the vent. Air samples were obtained using evacuated, 3-liter, stainless steel cylinders which were filled over a period of about 30 minutes. The filled sampling cylinders were returned to CRREL for gas chromatographic/mass spectrometric analysis. Under favorable conditions, the presence of an odor unique to the tunnel could be sensed at least 200 yards downwind from the air vent; under extremely unfavorable conditions, trace gases identified in the tunnel were present 40 yards downwind from the air vent in concentrations 10 to 100 times greater than were observed upwind. (Author abstract modified)
APTIC-24577

MEASURING METHODS FOR THE QUANTITATIVE MEASUREMENT OF SOLID PARTICLES IN FLUE GASES.

(Maetmetoder foer kvantitativ maetning av fasta
partiklar i roekgaser). Text in Swedish. VVS
(Tidsskr. Vaerme, Ventilations-, Sanitets-Och
Kylteknik (Stockholm)), 40 (3):149-161, March
1969. 16 refs.
Sten Olsson.
Identifiers: *Particulates, *Particulate sampling, *Stack sampling, Sweden, Stack gases, Photometric methods, Smokemeters, Samplers.

A number of particulate measuring devices of the so-called suction method are available. The accuracy of the method is within about 10%. The BP-method gives the weight of the particles, while the Shell method gives the total carbon content of the particles. Uniform standards and apparatus for particulate sampling are being developed. They should include standard measuring sections and outlets in flue gas ducts. Stack sampling for particulates must be done at several locations to insure a statistically accurate sample. Particulate levels can fluctuate due to fuel oil quality, damaged equipment, or poor maintenance. Photo-

electric smoke testing devices give the smoke density but not the dust content. They can be used to supervise oil or air firing quantities at constant smoke density. Functional devices for automatic continuous measurement of quantitative dust content in stack gases are not yet available, and intensive development work is required to produce them.
APTIC-24579

AIRCRAFT GAS TURBINE ENGINE EXHAUST SMOKE MEASUREMENT.

Aerospace Recommended Practice ARP 1179, 8p., May 4, 1970.
Personal Author Not Recorded.
Identifiers: *Engine exhausts, *Aircraft, *Gas turbines, *Measurement methods, Smokes, Particle size, Sampling probes, Source sampling, Maintenance, Data analysis, Flow rates, Temperature.

Procedures are described for determining and reporting the amount of smoke emission from an aircraft gas turbine engine. The purpose of the procedure is to standardize test equipment and procedures. The following items are enumerated: definitions and terminology; equipment (sample size and flow rate measurement, sampling probes and lines, and valving); test procedures; sampling procedures; system maintenance; information and data to be recorded; and data reduction and analysis.
APTIC-24581

A COMPARISON OF NAPCA AND IIA SOURCE SAMPLING METHODS.

Preprint, American Society of Mechanical Engineers, New York, 12p., 1970. 2 refs.
(Presented at the September 30, 1960 Meeting of the American Society of Mechanical Engineers, Incinerator Division, New York, N. Y.)
Gary D. McCutchen.
Identifiers: *Particulates, *Multiple chamber incinerators, *Source sampling.

Among the most widely used incinerator sampling techniques are those developed by the Incinerator Institute of America and the National Air Pollution Control Administration. Tests involving simultaneous measurements of particulate emissions from a multiple-chamber retort incinerator by the IIA-6 train and the NAPCA train indicate that tests results vary appreciably. Sampling was conducted at the inlet and outlet of the scrubber downstream of the fan, and the ratio of NAPCA to IIA results before and after the scrubber was plotted on log-probability paper. The difference between the inlet and outlet lines indicates that inlet and outlet ratios vary; and since the main difference between inlet and outlet ratios was the particulate loading of the flue gas, there is a possibility of a correlation between the ratios and particulate loading.
APTIC-24582

THE AMOUNT OF SULPHUR TRIOXIDE ACCUMULATED ON FIBRE-GLASS FILTERS USED FOR DETERMINING DUST CONTENT IN FLUE GASES.

(Untersuchungen ueber die Speicherfaehigkeit von SO3 in Glasfaserfiltern fuer Staubgehaltsbestimmungen in Abgasen). Text in German. Gesundh. Ingr., 88 (11):350-353, 1967. 9 refs.
Fritz Baum, and Helmut Beine.
Identifiers: *Sulfur trioxide, *Glass fabrics, *Absorption, Germany, Stack gases, Dusts, Colorimetry, Samplers, Sulfuric acid, Temperature.

The nature of the sorption of sulfur trioxide by the type of glass fiber filters used for dust sampling is investigated. The total amount of SO3 accumulated on filter papers can be determined by titration with sodium hydroxide, except in the case of glass fiber filters. A chemical reaction of SO3 with the glass fiber is presumed. To determine the effects of time and temperature on the amount of SO3 accumulated on the glass fibers, samples were placed in N sulfuric acid and held at 20 deg for various periods of time, or held for 6 hrs at various temperatures (20-98 deg). The amount of H2SO4 consumed is determined by titration with N NaOH. The amount of SO3 accumulated by the glass fibers increases only slightly with increase of time at 20 deg, but the increase is great as the temperature is increased.
APTIC-24584

TEMPERATURE AS A FACTOR IN DETERMINING ORDER OF ELUTION IN GAS-LIQUID CHROMATOGRAPHY OF SOME C5-C8 HYDROCARBONS.

J. Chromatog., 12 (1):104-106, Sept. 1963. 9 refs.
Bernard Balustein, Charles Zahn, and Gus Pantages.
Identifiers: *Column chromatography, *Hydrocarbons, *Temperature, Operating variables, Gas chromatography, Gases, Liquids.

As determined by plotting the logarithm of retention for eight hydrocarbons relative to hexane, at 40-80 deg, there is a complex relationship between the temperature of the gas-liquid chromatographic column and the order of elution for hydrocarbons. At 40 deg, the order of elution is 2,2,4-trimethylpentane (2,2 4-TMP), 1,1-dimethylcyclopentane (1,1-DMCP), 3-ethylpentane (3-EP) and cyclohexane (CH), 1-cis-3-dimethylcyclopentane (1-c-3-DMCP), 1-trans-3-dimethyl-cyclopentane (1-t-3-DMCP), heptane (Hp), and 1-trans-2-dimethylcyclopentane (1-t-2-DMCP). At 80 deg, the order of elution is 2,2-4-TMP, 3-EP, 1,1-DMCP, CH, Hp, 1-c-3-DMCP, 1-t-3-DMCP, and 1-t-2-DMCP. For the pair methylcyclohexane-1-cis-2-dimethylcyclopentane, the relative retention increases from 1.03 (4) at 40 deg, where they are not separable, to 1.05 (3) at 80 deg, where they could be separated sufficiently for analysis. Again, on the same column, the relative retention for the pair cyclopentane-hexane changes from 0.95 (4) at 40 deg to 1.03 (3) at 80 deg. For solutes that elute close together, column temperature may often be a factor in determining order of elution.
APTIC-24587

SAFETY IN AIR SEPARATION PLANTS: DETERMINATION OF ATMOSPHERIC POLLUTANTS BY GAS CHROMATOGRAPHY.

Nature (London), 205 (4966):67-68, Jan. 2, 1965. 6 refs.
K. Jones, and R. Green.
Identifiers: *Air separation plants, *Flame ionization detector, *Hydrocarbons, Great britain, Chemical processing, Design criteria, Aliphatic hydrocarbons, Nitrogen.

The primary cause of explosions in air separation plants is the accumulation of atmospheric pollutants condensed from the air stream at the very low temperatures involved in liquid air distillation. In an investigation of atmospheric pollutants in a nitrogen plant, hydrocarbons up to n-pentane were analyzed with a flame ionization detector and a Perkin Elmer model 451 ionization amplifier. The separation of methane to propylene was satisfactorily attained on a 6-ft by 0.25 in. outer diameter column of 3% di-2-ethylhexyl sebacate on 3-60 mesh silica gel separation of the C4's was achieved on a 14-ft by 0.25-in. outer diameter column of a 2.1:1 blend of the coated supports 20% bis (2-methoxyethyl) adipate and a 20% di-2-ethylhexyl sebacate on 'Chromosorbe P.' High acetylene levels were recorded, but wide fluctuations were found throughout the day. The C4's were surprisingly high and relatively consistent, and often individually greater in quantity than the more commonly expected impurities. Comparison with the work of Altschuller and Bellar showed methane quantities to be very much smaller and the number and quantity of C4's considerably higher.
APTIC-24592

A COMPARATIVE STUDY OF OXIDANTS AND OZONE IN LOS ANGELES ATMOSPHERE.

A.M.A. Archiv. Ind. Health, vol. 14:458-467, July-Dec. 1956. 15 refs. (Presented at the Air Pollution Control Association National Meeting, Buffalo, N. Y., May 21, 1956.)
N. A. Renzetti, and J. C. Romanovsky.
Identifiers: *Oxidants, *Chemical methods, *Sampling methods, *Ozone, Smog.

Four different samplers were compared for their ability to respond to oxidants in Los Angeles smog. The instruments, which sampled the Pasadena atmosphere from July 15 to November 15, 1955, a time of year when the incidence of smog is high, were a phenolphtalin oxidant apparatus, a potassium iodide continuous oxidant recorder; a rubber cracking apparatus, and an ozone ultraviolet spectrometer. The results of sampling are summarized in graphical form, including graphs of the diurnal variation of the responses of the four instruments. These graphs indicate the three chemical systems, phenolphtalin, potassium iodide, and rubber cracking, show the same response to smog oxidants, both as regards shape of curves and concentration values. As judged by ozone concentrations derived from ultraviolet absorption spectrometry, these chemical systems respond to other oxidants in addition to ozone. These other oxidants reach 10-40 pphm concentrations for ozone values above 20 pphm. It is concluded that any one of the three chemical methods can be used as an indicator of oxidant in Los Angeles smog, provided that a common reference method is used for their calibration.
APTIC-24597

METHOD AND EQUIPMENT FOR MAKING PREPARATIONS OF MICROSCOPIC PARTICLES OF SOLID SUBSTANCES.

(Zpusob a zarizeni k provedeni pripravy preparatu mikroskopickych castic pevnych latek). (Assignee not given.) Czech. Pat. 118,566. 10p., May 15, 1966. (Appl. Nov. 27, 1964, claims not given).
Translated from Czech. by S. Berger, Addis Translations International, Woodside, Calif., 10p., Oct. 1969. CFSTI: PB188150T
J. Blazek, and B. Starkova.
Identifiers: *Particulates, *Membrane filters, *Electron microscopy, Czechoslovakia, Centrifugal separators.

Known methods for preparing a sample of particles for electron microscope analysis are cumbersome and difficult. One method collects the particles on a thin membrane which must be backed by a supporting grid. The quality of the sample can be impaired by the handling required to transfer the membrane onto the supporting grid and, later, to insert it in the microscope. Problems are also encountered in separating particles from a gaseous medium onto the membrane. if the particles are centrifuged, they are acted on not only by centrifugal force but by the velocity of the gas stream, which distorts the granulometric composition. These disadvantages are overcome by directing the centrifuging of particles from a liquid suspension onto a grid-supported membrane. To accomplish this, at least one pin with a two-part holder is placed in an ordinary centrifuge. The holder contains the membrane backed by a grid placed perpendicular to the resultant centrifugal force. The method avoids the complicated manipulations involved in transferring the membrane from glass to the supporting grid. No distortion of the granulometric composition occurs because all particles from the liquid suspension column above the membrane are centrifuged onto the membrane.
APTIC-24598

APPLICATION OF HETEROGENEITY EFFECTS ENCOUNTERED IN THE ABSORPTION AND EMISSION OF X-RAYS TO ON-STREAM SENSING OF VARIABLES SUCH AS PARTICLE SIZE.

Preprint, Institution of Mining and Metallurgy, London, 13p., 1969. 3 refs. (Presented at the

Commonwealth Mining and Metallurgical
Congress, 9th, London, May 5-24, 1969, Paper 5.)
K. G. Carr-Brion.
Identifiers: *Radiography, *Particle size, *Fluorescence, Great britain, Gases, Liquids, Solids.

Sensors using X-ray attenuation and X-ray fluorescence were developed to indicate variations in particle size in process streams. The sensors were provided with radioisotope sources and their efficiencies for measuring barytes, galena, hematite, and cassiterite particles were evaluated in the laboratory under recirculating loop conditions. Both sensors can be used with flowing slurries and should also be capable of operation with particles suspended in other media, including gases. The transmission (X-ray attenuation) sensor should be particularly applicable to gas-solid systems because the contrast between the X-ray absorption coefficients of particle and medium is even greater than that found with liquid-solid systems. By allowing the use of strongly attenuated radiation such as very low energy X-rays and Beta particles, smaller particle sizes and materials of lower atomic number could be examined. However, each potential application of the sensors requires a detailed investigation, since they can be affected by variations in the compositions of the solid.
APTIC-24600

AIR POLLUTION CONTROL: HEALTH ASPECTS AND MICROTECHNIQUES.

Trans. N. Y. Acad. Sci., Ser. 2, 18 (4):289-297,
Feb. 1956. 28 refs.
Leonard Greenburg, and Morris B. Jacobs.
Identifiers: *Air pollution episodes, *Analytical methods, *Measurement methods, *Sampling methods, Humans, Deposition, Health impairment, Fuels, Dust fall, Soot fall, Iodimetric methods, Colorimetry, Lead peroxide candle, Hi-vol samplers, Impingers, Membrane filters, Absorption, Adsorption, Infrared spectrometry, Aldehydes, Ammonia, Cyanides, Fluorides, Hydrocarbons, Lead compounds, Carbon monoxide, Nitrogen oxides, Sulfur dioxide, Sulfur trioxide, Ozone, Hydrogen sulfide, Combustion, Condensation.

The greatest source of air pollution in New York City is burning fuels. The relationship of air pollution to health is dramatically indicated by the episodes in the Meuse Valley, in Donora, Pa., in Poza Rica, Mexico, and in London, England. The principal category of microanalysis in air pollution studies is the determination of very small amounts of a substance in a large volume of air. The principle of deposition is used for sootfall or dustfall sampling. Absorption methods for air sampling are of two types: impingers and absorbers. Filtration methods include the high-volume sampler, the automatic paper tape samplers, and millipore filters. Condensation and adsorption are also employed in collecting work. The peroxide method is preferred over the alkaline iodide or colorimetric method in analyzing sulfur dioxide. Sulfur trioxide can be measured by direct titration and gravimetrically. Infrared spectrometry is the method of choice for determining carbon monoxide; however, the CO tube colorimetry method has been adopted by some investigators. The method commonly used for nitrogen oxides involves estimating by the phenodisulfonic acid method. Ammonia and ammonia compounds are trapped in a bubbler containing sulfuric acid and are estimating by nesslerization. Methods of analysis are described for aldehydes, cyanides, fluorides, ozone, hydrogen sulfide, lead, hydrocarbons, and other components.
APTIC-24603

ALTERNATING CURRENT POLAROGRAPHIC ANALYSIS OF LEAD IN AUTOMOBILE EXHAUST GAS.

(Jidosha haikigasuchuno namari no koryu
porarogurafu bunseki). Text in Japanese. Bunseki
Kaguka (Japan Analyst) (Tokyo), 19 (10):1364-
1370, Oct. 1970. 16 refs.
Takeshi Ishii, and Soichro Musha.
Identifiers: *Engine exhausts, *Polarographic methods, *Tetraethyl lead, Japan, Automobiles, Experimental methods.

A method for the alternating current polarographic determination of lead in automobile exhaust gas is established. Lead in automobile exhaust gas was extracted for 60 sec with 20 ml of 1.2 F hydrochloric acid in an extraction apparatus. The extract was cooled at room temperature and transferred into a 25 ml measuring flask and then diluted to the mark with 1.2 F HCl. The alternating current polarogram in the region of applied potential from -0.1 volt to -0.8 volt against the mercury pool anode after bubbling for 5 min with nitrogen is recorded, and lead is determined by referring to a calibration curve. This method is rapid and simple; the time required for analysis is about 20 min.
APTIC-24617

RAPID ANALYSIS OF LEAD IN AUTOMOBILE EXHAUST GAS.

(Jidosha haikigasuchuno namari no jinsoku
bunseki). Text in Japanese. Bunseki Kagaku
(Japan Analyst) (Tokyo), 19 (10):1436-1437, Oct.
1970. 3 refs.
Takeshi Ishii, and Soichiro Musha.
Identifiers: *Engine exhausts, *Spectrophotometry, *Tetraethyl lead, Japan, Measurement methods, Tetraethly lead.

The lead content in automobile exhaust gas can be determined by atomic absorption measurement. A sample is directly injected into an air-hydrogen flame by an atomizer burner, and the spectral line of lead is measured at 2833 A. The method is rapid and simple; the time required for an analysis is about 5 min.
APTIC-24618

DETERMINING THE COMPOSITION OF RAW BENZENE BY GAS-LIQUID CHROMATOGRAPHY.

(Opredeleniye sostava syrogo benzola metodom
gazozhidkostnoy khromatografii). Text in Russian.
Koks i Khim., no. 6:35-37, 1970. 5 refs.
A. M. Khalaimova, M. F. Kovalenko, and Ye. A.
Zherdeva.
Identifiers: *Coke oven gas, *Gas chromatography, *Benzenes, Ussr, Combustion gases, Coke, Fuel gases, Blast furnaces, Toluenes, Xylenes, Carbon disulfide.

Results of gas-liquid chromatography of raw benzene derived from coke-oven gas are presented. The benzene content was 3-6% higher and xylene content 1-2% higher than indicated by fractional distillation. Blast-furnace coke contained 8-10% more total raw benzene than foundry coke, but less of the following constituents (% abs.): toluene, 3-4; xylene, 2; carbon disulfide, 0.4; and pseudocumene, 0.5.
APTIC-24621

THE MILLIPORE FILTER TECHNIQUE FOR ICE NUCLEI MEASUREMENT.

J. Appl. Meteorol., 9 (5):796-799, Oct. 1970. 10
refs.
A. J. Alkezweeny.
Identifiers: *Membrane filters, *Nucleation, *Ice, Continuous monitoring, Design criteria, Thermocouples, Supersaturation.

A diffusion chamber is described that permits improved processing of Millipore filters used in measurements of ice nuclei. In the chambers, the filters are contained in trays resting on a brass plate that is cooled from the bottom by three thermoelectric coolers connected in series. Ice formed on the base of the chamber from a thin water film acts as a water vapor source. The temperatures of the filters and the ice surface are measured by two fine thermocouples connected to a two-channel recorder for continuous recording. Because the chamber can maintain these temperatures to within less than 0.1 C for several hours, the nuceli temperature and the supersaturation are similarly held essentially constant. Condensation of vapor on the lower surface of the filter instead of nuclei is avoided by placing a thin film of hot vaseline between the filter and the tray. The number of nuclei grown on the filters increases with supersaturation and processing time up to 20 min. The concentration is not affected by volume of air sampled, although this effect could be important if the air is polluted.
APTIC-24626

THE CONDENSATION NUCLEI COUNTER AS AN AIR POLLUTION WEAPON.

Opt. Spectra, 4 (7):76-79, July/Aug. 1970. 5 refs.
Anthony J. Nesti Jr.
Identifiers: *Portable, *Aitken counters, Droplets, Monitoring, Continuous monitoring, Particle size, Design criteria, Light scattering.

While airborne particles above 0.1 micron constitute the greater fraction by weight, submicroscopic particles between 0.001 and 0.1 micron are greater in number and concentration. These particles, known as condensation or Aitken nuclei, are smaller than the wavelength of visible light and their ability to scatter light is negligible. One of the simplest means of detecting the particles is to utilize their ability to function as centers (nuclei) for the condensation of water vapor in a supersaturated environment. By condensing water on the nuclei, it is possible to create droplets of visible size. Detection and measurement by optical techniques can then be effected. A new battery-operated portable condensation nuclei counter uses the light extinction principle as a means of measuring droplet concentration and presents a continuous output reading by automatically processing an air sample at the rate of 2 per sec. It will measure concentrations of from 500 to 10 to the 7th power particles per cu cm. In addition to the direct monitoring of airborne particles, another promising application of condensation nuclei counters is detecting the presence of gaseous contaminants in the air. All that is required is a device at the inlet to convert the gas molecules to particulate matter that can act as condensation nuclei.
APTIC-24634

REMOTE RAMAN SPECTROSCOPY AS A POLLUTION RADAR.

Opt. Spectra, 4 (7):63-66, July/Aug. 1970. 5 refs.
T. Hirschfeld, and Stanley Klainer.
Identifiers: *Raman spectrometer, Monitoring, Continuous monitoring, Lasers, Mapping, Spectrometry, Light scattering.

The remote Raman spectrometric technique is a logical extension of lidar which utilizes the single-ended, remote, range-resolved measurement of light back-scattered from particles to give a three dimensional plot of their concentration in the atmosphere. The techqique is being investigated because of the acute need for a method of identifying and three-dimensionally mapping the concentration of molecular dispersed species in air. When the remote Raman system is operated, the constituents in the atmosphere are irradiated by a laser and a Raman shift occurs, resulting in spectral lines which are characteristic of the species intercepting the radiation beam. The signal from the sample is observed through the system's telescope whose field of view is co-linear to that of the laser. The observed signal is sent to a double-pass grating monochromator which provides continuous wavelength selection. Detection limits of the spectrometer are presented for small concentrated clouds (pollution clouds) or large dilute clouds (ambient pollution). Monitoring is possible of either the behavior of pollution sources of the ambient levels, on a 24-hr basis, with high selectivity and unambiguous identification.
APTIC-24637

MEASUREMENT OF AUTOMOBILE EXHAUST GAS.

(Jidosha haishutsu gasu no sokutei). Text in Japanese. Sangyo Kogai (Ind. Public Nuisance), 6 (9):522-531, Sept. 25, 1970. 8 refs.
S. Yanagihara.
Identifiers: *Engine exhausts, *Flame ionization detector, *Sampling methods, Japan, Fuel evaporation, Diesel engines, Automobiles, Digital methods, Infrared spectrometry, Hydrocarbons, Nitrogen oxides.

Until completely exhaust-free automobiles are in general use, the measurement of exhaust gas is a technological necessity. Although there is still a great gap between the U. S. and Japan in the field of practical measurement, Japan is getting close to the American level. Conditions for running automobiles, including the U. S.'s 7-mode, new American trial run conditions, the Japanese 4-mode hot start, and the European 4-cycle cold start methods are described. Various sampling methods for exhaust gas, such as bag sampling, total bag sampling, constant volume sampling, ratio sampling, non-dispersive infrared continuous analysis method, and use of the hydrogen flame ionization detector are described. These methods present some problems, since they are not the best methods in obtaining the average density of exhaust. Data must be treated on-line; digitalized tape can be treated by a computer later; or a digital method using a mini-computer must be adopted. The above are only part of the methods in use, and there will be many more changes. In Japan, it is important to measure oxides of nitrogen and hydrocarbons in the analysis of diesel exhaust. Evaporation loss must also be measured.
APTIC-24638

ATMOSPHERIC POLLUTION IN THE USA: EXPERIENCES GAINED DURING A STUDY TOUR. TECHNICAL ASPECTS.

(Luchtverontreiniging in de USA: Ervaringen tijdens een studiereis. Technische aspecten). Text in Dutch. De Ingenieur, 82 (41):G89-G97, Oct. 1970. 14 refs.
L. J. Brasser.
Identifiers: *The netherlands, *Air quality measurement programs, Abatement, Education, California, Europe, New york city, United states, Engine exhausts, Stack gases, Fumes, Smokes, Diesel engines, Measurement methods, Automatic methods, Statistical analyses, Diffusion, Plume behavior, Nitrogen oxides, Sulfur dioxide.

During a study-tour of the U. S,, several meetings were attended and a large number of laboratories and institutions were visited. Networks for the measurement of air pollution are descirbed, ranging from local networks to highly sophisticated networks with automatic measuring devices and teledata transmission. Some measuring methods are described. In this respect, special attention is paid to methods for the determination of sulfur dioxide and nitrogen oxides. The statistical work with the obtained data is reviewed. Some special subjects are dealt with more in detail, including the energy production in New York City, diesel fume control in New York City, traffic air pollution abatement in California, air pollution training, and study of the diffusion of somke plumes. Some relevant literature is cited.
APTIC-24639

MEASURING METHOD OF AIR POLLUTANTS DUE TO AUTOMOBILE EXHAUST.

(Jidosha haishutsu gasu ni yoru taiki osen busshitsu no sokuteiho). Text in Japanese. Sangyo Kogai (Ind. Public Nuisance), 6 (9): 532-538, Sept. 25, 1970. 28 refs.
N. Yamate.
Identifiers: *Engine exhausts, *Analytical methods, *Monitoring, Manual, Japan, Continuous monitoring, Intermittent monitoring, Gas sampling, Samplers, Hydrocarbons, Lead compounds, Peroxyacetyl nitrate, Carbon monoxide, Nitrogen oxides, Sulfur dioxide.

Pollutants in auto exhaust can be measured by continuous analysis or by manual analysis (discontinuous). The former uses an automatic gauge to evaluate the pollution situation over a long period of time; the second method is applied when many sites are to be sampled for short-term periods. Various methods of collecting exhaust samples are described. They include impingers, bags or vacuum collecting glass vessels, low-temperature condensation methods, normal temperature adsorption methods, and low-temperature condensation methods, normal temperature absorption methods, and low- and high-volume samplers. Manual methods (using detector tubes, infrared absorption or gas chromatography) and continuous methods (infrared absorption, the oxidized mercury method) of determining carbon monoxide are described. Nitrogen oxides can be manually analyzed by both the Saltzman and Jacob methods and also continuously analyzed by the Saltzman method. For hydrocarbon determinations, gas-chromatography is used for manual analysis and hydrogen flame ionization for continuous analysis. A chromatropic acid method is used for manual analysis of HCHO along with an acetylacetone method that is also suitable for continuous measurements. Sulfur dioxide in manually analyzed by the rozaniline method and continuously by the Thomas autometer method. For manual analysis of ozone and general oxides, there are the phenolphthalein and iodated kalium methods, for continuous analysis there are the Crone method and the method of gauging the light absorbed by iodine. Measurements for PAN, lead compounds, and aromatic hydrocarbons are also described.
APTIC-24644

AN ABSORPTION APPARATUS FOR GAS ANALYSIS.

(Eine Absorptionsapparatur zur Gasanalyse). Text in German. Staub, Reinhaltung Luft, 30 (8):336-337, Aug. 1970.
Reinhard Nagel, and Klaus Jander.
Identifiers: *Chemical methods, *Absorption, *Design criteria, Portable, Germany, Smokes, Sulfur dioxide.

The quantitative analysis of gases which form less than 1% of a gas mixture is performed by chemical analysis of the gas absorbed in an absorption fluid. Several absorption vessels are sometimes required namely when several gases are to be absorbed separately, when the gas is not fully absorbed in one bottle, or when a volatile substance (iodine) is in the first bottle. For such cases, an instrument consisting of 2 or more interconnected absorption bottles placed one on top of the other is proposed. The gas enters the bottom vessel through a frit and the vessel is filled with an absorption liquid through a nozzle. From there, the gas enters through a connecting tube a superimposed second identical absorption vessel also filled with an absorption liquid. The absorption liquids are then drained and analyzed for their gas content or samples of the absorption liquid are drawn off by a pipette and analyzed. The apparatus can be placed in a portable wooden frame. It has been tested in sulfur dioxide determinations from smoke gases by the iodine-thiosulfate method and found convenient and practical.
APTIC-24651

DEPENDENCE OF SULFUR DIOXIDE ABSORPTION ON TEMPERATURE IN THE WEST-GAEKE METHOD.

(Temperaturabhaengigkeit der Absorption von Schwefeldioxid beim West-Gaeke-Verfahren). Text in German. Ana. Chem. (Berlin), 251 (5):300-301, 1970. 8 refs.
Erdwin Lahmann, and Karl Ernst Prescher.
Identifiers: *West and gaeke, *Sulfur dioxide, *Temperature, Germany, Absorption, Flow rates.

The West-Gaeke method (determination of sulfur dioxide in atmospheric air) is based on the formation of a sodiumtetrachloromercurate complex with SO2 in a solution the color intensity of which is measured following the addition of pararosanilin and formaldehyde. The effect of temperature on the absorption of SO2 by the solution was measured in an experimental arrangement at temperatures from 0 to 40 C. At temperatures between 10 and 40 C at a flow volume of 100 l/h of air containing 0.92 mg SO2/ cu m, SO2 absorption was within permissible limits of the standard deviation. But at a flow volumes of 10 l/h, SO2 absorption was significantly reduced. Between 0 and 10 C, absorption with a low flow volume was constant; with a higher flow volume, SO2 absorption manifested a decreasing tendency. In practice, temperatures during testing should be kept between 10 and 40 C.
APTIC-24652

PROBLEMS IN THE GRAVIMETRIC MEASUREMENT OF RESPIRABLE COAL MINE DUST.

J. Occupational Med., 12 (10):400-409, Oct. 1970. 8 refs. (Presented at the Industrial Medical Association Annual Meeting, 55th, Chicago, Ill., April 15, 1970.)
Kenneth M. Morse.
Identifiers: *Dusts, *Coal, *Automatic methods, *Samplers, Deposition, Retention, Pneumoconiosis, Mining, Particle counters, Particle shape, Particle size, Membrane filters.

Utilized by qualified persons, the gravimetric method of dust assessment is simple and can eliminate the tedious particle count method that is time-consuming and uneconomical. However, the accuracy of the results depend upon resolving inherent errors which are due to human and instrumental factors. The parameters of particle count, mass, and surface area are all used in dust measurement methods. Dust standards and the instrumentation used should describe a dust cloud by the parameter which most closely correlates with the hazard of pneumoconiosis. The present gravimetric sampler is based on alveolar deposition of spherical particles of unit density; it has a sampling range from 100% of particles 1 micron or less to 0% of particles greater than 7 micron. Several examples of approved gravimetric instruments are given. The effectiveness and correlation of different types of samplers are discussed. Some of the problems involved in the use of gravimetric samplers are training, flow rate disagreement, unattended operation, preweighed filter control, filter selection, rock dust contribution, moisture effects, cyclone orientation, weighing problems, quartz analysis, and lack of correlation with pulmonary response. Until the parameter determined by gravimetric dust samplers is correlated with pulmonary response to dust inhalation, a standard is premature and should not be established.
APTIC-24656

DESIGN OF A FACILITY (SMOG CHAMBER) FOR STUDYING PHOTOCHEMICAL REACTIONS UNDER SIMULATED TROPOSPHERIC CONDITIONS.

Environ. Sci. Technol., 4 (11):907-916, Nov. 1970. 23 refs.
George J. Doyle.
Identifiers: *Smog, *Irradiation chambers, *Photochemical reactions, Design criteria, Simulation, Testing facilities, Lower atmosphere, Humidity, Pressure (atmospheric), Temperature (atmospheric), Olefins, Nitric oxide (no), Nitrogen dioxide (no2), Ozone, Catalytic activity, Combustion, Light radiation.

The design and construction of a facility for studying photochemical reactions in air under tropospheric conditions (photochemical smog) is described. Salient aspects of the facility are use of catalytic combustion over platinum at elevated pressures (5 to 8 atm) and temperatures (600 C) to remove inadvertent contaminants from air used to make up the reaction mixtures, close control of humidity and temperature (down to 27 C), a low exchange rate between the reaction chamber and the ambient atmosphere (1.5%/hr), approximate simulation of tropospheric radiation between 300 and 600 nm and a teflon-lined reaction chamber.

The purified air contains less than 0.5 ppm of nitrogen dioxide and a trace of organic impurity that is photochemically inactive. Ozone has a long half-life, both irradiated and non-irradiated (7.8 and 20 hr), within the reaction chamber. Photooxidation of trace concentrations of olefin and nitric oxide gives results somewhat different from, but comperable with, those of other investigators. (Author abstract)
APTIC-24659

PALLADIUM DEVICES FOR GAS CHROMATOGRAPHY.

J. Chromatographic Sci., vol. 8:452-457, Aug.
1970. 6 refs. (Presented at the International
Symposium on Advances in Chromatography, 6th,
Miami Beach, Fla., June 2-5, 1970.)
J. E. Lovelock, P. G. Simmonds, G. R. Shoemake,
and S. Rich.
Identifiers: *Palladium, *Gas chromatography, *Mass spectrometry, Metals, Design criteria, Instrumentation, Hydrogen, Pressure, Ions.

An experiment to obtain design information for a separator device which can match the output of a gas chomatographic column to the input of a mass spectrometer ion source is described. A heated palladium-silver tube, connected between the inlet to a vacuum system and a source of hydrogen, was supplied with hydrogen under increasingly high pressures. Pressure in the ion source remained the same or a little lower than at the start of the experiment. The hydrogen finally broke through at a tube inlet pressure of 780 torr and an input flow of 3.6 atm ml/sec. It was possible to maintain an active, open barrier between gas at ambient pressure and a hard vacuum; the results were related to studies of the unique properties of palladium alloys to selectively allow the permeation of hydrogen through the metal in an efficient manner. Descriptions are given of several devices designed and tested for gas chromatographic systems: a palladium transmodulator, a palladium separator for joining a gas chromatograph directly to a mass spectrometer, a combination hydrogen generator-separator, and a palladium detector. Using the combination hydrogen generator-separator and the palladium detector, an integrated circuit gas chromatographic system is also described.
APTIC-24665

DETAILED DETERMINATION OF NITROGEN COMPOUNDS CONTAINED IN WASTE GASES.

(Differenzierte Bestimmung von
Stickstoffverbindungen in Abgasen). Text in
German. Wasser Luft Betrieb, 14 (9):354-357,
Sept. 1970. 13 refs.
Juergen Bernert.
Identifiers: *Food and feed operations, *Measurement methods, *Organic nitrogen compounds, Hogs, Poultry, Germany, Farms, Stack gases, Chemical processing, Slaughterhouses, Ammonia, Amines.

The emission of nitrogenous compounds from poultry farms, pig farms, slaughterhouses, fish meal factories, phenol-formaldehyde processing plants and from other sources which have hitherto been neglected contain dimethylformamide, mono-, di-, and trimethylamine, aniline and pyridine, nitrobenzene, dinitrobenzene, and its isomers the maximum permissible emission of which has by recent guidelines been limited to 20 mg/N cu m waste gas and 5 kg/hr. While no practicable analytical method is available for the separate quantitative determination of all these compounds, a procedure is described which separates ammonia, low boiling bases (organically bound nitrogen following water vapor distillation), higher boiling bases (organic bound nitrogen following kjeldalization), and nitrite and nitrate ions. An analysis of exhaust air from two chicken manure drying plants performed by this method disclosed that in one case, 14500 N cu m/h polluted air emitted 1675 g/hr ammonia and 1285 g/hr amines calculated as methylamine. Poultry farm air contained approximately 10 mg/N cu m ammonia and 4.0 mg/N cu m amines calculated as methylamine. Air from a piggery contained approximately 5 mg ammonia/N cu m; air from mineral wool manufacturing plants in one case, approximately 50 mg ammonia/N cu m and in another, approximately 20 mg ammonia/N cu m.
APTIC-24682

ABSTRACTS OF PAPERS ON INDOOR AIR POLLUTION (SUSPENDED PARTICULATES) CONTROL IN ARCHITECTURE. PART I.

(Kenchikugaku ni okwru shitsunai kuki osen
(fuyu jinai) boshi ni kansuru bunken shoroku. 1).
Text in Japanese. Kuki Seijo (Clean Air J. Japan
Air Cleaning Assoc., Tokyo), 8 (2):47-61, June 1
1970. 42 refs.
Fumiko Sugawara.
Identifiers: *Buildings, *Suspended particulates, Japan, Filters, Particle size, Samplers, Dispersion, Aerodynamics.

The effects of atmospheric particulates on room air; distribution of particulates in an ascending air current; measurement of airborne particulates by air sampler; particle diameter of dusts; particle diameter of airborne particulates; an experimental device for testing dusts; airborne particulates; and the efficiency of filters are presented in abstract form. The papers were chosen from scientific journals in architecture.
APTIC-24684

A MODIFIED TUBULAR ELECTROFILTER FOR COLLECTING DUST SAMPLES FROM THE AIR.

(Modifitsirovannyy trubchatyy elektrofil'tr dlya
otbora pylevykh prob iz vozdukha). Text in
Russian. Gigiena i Sanit., 35 (8):68-70, 1970. 2 refs.
A. I. Kosenko.
Identifiers: *Dusts, *Samplers, *Electrostatic precipitators, Ussr, Design criteria, Temperature (atmospheric), Flow rates, Voltage.

The modified electrofilter air sampler described differs from previous models in that the two sampling heads are attached to the main power unit by means of flexible tubes, thereby facilitating ease of handling and placement. Also, the power supply has been transistorized, with added provision for battery operation. Voltage across the corona electrodes is 6.5-7 kv at a current of 140-150 microamps, and air flow rate is 20 l/min. This instrument is especially suited for use where air temperatures exceed 60 C.
APTIC-24686

AN EXPRESS DETERMINATION OF OZONE CONCENTRATION IN THE AIR.

(Ekspressnoe opredelenie kontsentratsii ozona v
vozdukhe). Text in Russian. Gigiena i Sanit., 35
(8):70-72, 1970. 3 refs.
S. A. Erin, and V. V. Rezvushkin.
Identifiers: *Ozone, *Phosphorescence, Ussr, Analytical methods, Measurement methods, Ethylene, Flow rates.

Chemoluminescence determination of ozone using a standard PP-8 instrument in combination with an FEU-29 scintillation counter is described. An optimum ethylene flow rate of 0.5 l/min was established for measurement of atmospheric ozone at concentrations up to 0.0008 mg/l. Detection sensitivity over a 100-sec counting period is 0.0000025 mg/l, and the presence of nitrogen oxides does not interfere with measurement.
APTIC-24691

IONIZATION-CHROMATOGRAPHIC DETERMINATION OF NITRILES IN THE 6ATMOSPHERE.

(Ionizatsionno-khromatograficheskoye
opredeleniye nitrilov v atmosfernom vozdukhe).
Text in Russian. Gigiena i Sanit. 35 (8):63-67, 1970.
4 refs.
M. T. Dmitriev, and N. A. Kitrossky.
Identifiers: *Flame ionization detector, *Nitriles, Ussr.

Detection of nitriles using an LKhM-7A gas chromatograph with a flame-ionization detector is described. The detection threshold of this system is 0.005-0.01 micrograms; detection of nitriles, as well as accompanying substances is possible well below maximum allowable concentrations. Detection characteristics are tabulated for several nitriles (hydrogen cyanide, acetonitrile, acrylonitrile, propionitrile, methacrylonitrile), as well as a number of common accompanying substances. Column retention times for a number of substances are plotted as a function of their boiling points, and a single curve fits data for both nitriles and for hydrocarbons. Individual detection of nitriles is possible by this method, and the presence of ammonia does not interfere with this detection.
APTIC-24693

SINGLE DETECTOR AND FORECOLUMN TRAP FOR SERIES GAS-CHROMATOGRAPHY ANALYSIS.

J. Chromatog., 13 (2):361-365, Feb. 1964. 8 refs.
L. A. Robbins, R. M. Bethea, and T. D. Wheelock.
Identifiers: *Gas chromatography, Design criteria, Methanes, Hydrogen, Nitrogen, Carbon dioxide, Carbon monoxide, Sulfur dioxide, Oxygen, Hydrogen sulfide.

A gas chromatography system is described for analyzing carbon dioxide, hydrogen sulfide, oxygen, hydrogen, nitrogen, methane, carbon monoxide, and sulfur dioxide from a single gas sample. The system consists of three columns in series. Column 1 separates the polar gases, which are then irreversibly absorbed on Column 2. Column 2 delays but does not absorb the other gases, which are subsequently separated on Column 3. Eluted peaks from Column 1 are detected in the reference side of the thermal conductivity cell and peaks from Column 3 in the sample side of the cell. (Author summary)
APTIC-24699

STUDY OF THE ATMOSPHERIC POLYCYCLIC HYDROCARBONS. I. PROBLEMS CONNECTED WITH THE COUPLING OF THIN-LAYER CHROMATOGRAPHY AND GAS CHROMATOGRAPHY.

(Etude des hydrocarbures polycycliques de
l'atmosphere. I. Problemes nes du couplage de la
chromatographie sur couches minces et de la
chromatographie en phase gazeuse). Text in
French. J. Chromatog., 45 (3-4):415-420, Dec. 23,
1969. 11 refs.
G. Chatot, W. Jequier, M. Jay, and R. Fontanges.
Identifiers: *Gas chromatography, *Thin-layer chromatography, *Polynuclear compounds, France, Flame ionization detector.

Due to their potential carcinogenic effect, the polycyclic hydrocarbons, aromatic or heterocyclic, have been investigated. It would be worthwhile to discover if there is a relation between the geographical distribution of the tumors and the concentration of certain hydrocarbons in the atmosphere. Methods of separations are thin layer chromatography, column chromatography, and gas chromatography. Thin layer chromatography has proved more efficient. The method has made possible the separation of the hydrocarbons belonging to a particular class and their isolation within a mixture of components of particular interest. However, thin layer chromatography has been mainly used on mixtures of synthetic products or on fractions of atmospheric pollutants previously purified with physico-chemical methods. Thin layer chromatography should be coupled with gas chromatography to achieve best results. A review of materials and thin layer chromatography is given. Equipment used is a model 2500 Mikrotek, furnished with two identical columns and a double flame ionization detector. Chromatograms obtained are represented.
APTIC-24705

AIR POLLUTION MEASUREMENTS. DEVELOPMENTS IN AIR POLLUTION MEASUREMENT.

Phil. Trans. Roy. Soc. London, Ser. A., 257 (1161):143-151, Nov. 13, 1969. 12 refs.
D. H. Lucas.
Identifiers: *Dusts, *Measurement methods, *Recording methods, Great britain, Monitoring, Smokemeters, Particle size, Samplers, Plume behavior, Winds, Sulfur dioxide.

The behavior of plumes from tall chimneys is now fairly well understood. To achieve this understanding, it was necessary to develop high-speed recording devices for sulfur dioxide concentrations and plume height and to use recorders of atmospheric turbulence and temperature profile at heights up to some hundreds of meters. Instruments for pollution control, in particular the control of dust, have a different requirement. They must be simple and also capable of measuring meaningful functions of the basic variables rather than a single variable. A dust gauge measures in the field the nuisance value of dust concentration and dust velocity, and is also dependent on wind direction. A monitor control, which can be used for emission measures, before emission, the same function of the dust variables. It supplements the smoke meter which measures dust concentration and particle size. The zero stability of both instrument types has been studied and improved. The averaging time of a measurement is an important conception, both in the investigation and control of pollution. In monitoring instruments, this time must be related to the 'integrating time' of each type of complaint. The latter time is that required for a pollutant to produce its full effect from an arbitrary starting time. (Author abstract modified)
APTIC-24715

FLAME PHOTOMETRIC DETERMINATION OF LEAD AND MANGANESE IN GASOLINE.

Anal. Chem., 31 (11):1798-1802, Nov. 1959. 14 refs. (Presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Pittsburgh, Pa., March 1959.)
Garland W. Smith, and Alton K. Palmby.
Identifiers: *Gasolines, *Spectrophotometry, *Tetraethyl lead, *Manganese compounds, Photometric methods, Organometallics.

Rapid and accurate flame photometric methods are described for determining lead and manganese in gasolines. In each method, the sample is burned in an oxyhydrogen flame. In the lead method, base stock effects are eliminated by using an incremental addition of lead for calibration. In the manganese method, base stock effects are reduced sufficiently by diluting the sample at least twentyfold with iso-octane. Lead naphthenate and tetraethyl lead are equally satisfactory reference materials for determining tetraethyl lead; manganese naphthenate is satisfactory for determining organomanganese additives. Burner fouling, a major source of error, is eliminated by periodically aspirating acetone through the burner. The determinations are accurate to about 2% of the amount present for lead, and to about 3% for manganese. Approximately 40 lead or 80 manganese determinations can be made per man-day. (Author abstract modified)
APTIC-24719

EFFECT OF PARTICLE SIZE ON THE DETERMINATION OF INORGANIC SULFUR IN COAL.

In: Report of Bituminous Research Activities. Pennsylvania State Univ., University Park, Dept. of Fuel Technology, Serial No. 57, p. 1-8, 1956. 8 refs.
L. Grant Lesoine.
Identifiers: *Coal, *Chemical methods, *Particle size, *Sulfur compounds, Measurement methods, Nitric acid, Iron compounds.

The effect of reducing the standard 60-mesh coal samples to micron size was investigated to determine if the size of the coal materially quantitatively affects the determination of inorganic sulfur using the Eschka, and Powell and Parr Methods. A significantly higher inorganic sulfur content was obtained with micron-size coal. The pyritic iron content also increased in the same proportion. This leads to the conclusion that finely divided pyrite is intimately associated with the coal substance and is made more amenable to reaction with nitric acid when ground to micron size. Since both the sulfur and iron contents increased proportionally, it appears doubtful that any sulfur-bearing inorganic material other than pyrite is present in any significant quantity in the occluded matter. The iron content calculated to percent sulfur was greater in all cases than the actual total inorganic sulfur. Hence, it is assumed that acid extraction of the coal did not remove organic sulfur from these coals. The difference in values leaves a question as to the dependability of the usual inorganic sulfur analysis or to the validity of the term 'inorganic' sulfur as applied to acid-extractable sulfur. (Author summary modified)
APTIC-24725

PERFORMANCE OF A CONTINUOUS COLORIMETRIC AIR MONITOR.

Preprint, Technicon, 37p., 1969. 7 refs. (Presented at the Technicon International Congress on Automated Analysis, Chicago, Ill., June 1969.)
Yoshiro Tokiwa, K. R. Smith, and Peter K Mueller.
Identifiers: *West and gaeke, *Continuous monitoring, *Design criteria, *Sulfur dioxide, Automatic methods.

A modified version of the West-Gaeke colorimetric method was automated for the continuous analysis of sulfur dioxide in the Technicon Monitor IIA. Major components in this unit include a reagent proportioning pump, a colorimeter and readout system, an air pump, and an absorption column. A standard Technicon proportioning pump is used at one-quarter normal speed. All reagents are pumped by peristaltic action through individual plastic tubes mounted parallel to each other. The colorimeter uses a single tungsten lamp which provides two light beams, each passing through a bandpass filter to a reference and a sample photocell. Colorimeter output is fed into a Bristol Dynamaster recorder. Sample air is pulled through the absorber column by a diaphragm-type pressure-vacuum pump. The following aspects of the instrument were studied: performance of colorimeter-recorder system, response to dilute sulfur dioxide streams in air, effect of temperature, interference from nitrogen dioxide, and stability and durability. Specific items on which data were obtained are summarized in tabular form. The evaluation indicates that the instrument is deficient for SO2 analysis in two major respects: reagent formulation and control of absorbing solution flow rate. Further modifications are proposed.
APTIC-24728

ESTIMATION OF THE ANNUAL AVERAGE OF PARTICLE FALL BY MONTHLY VALUES. TOTAL DUSTFALL AND DUSTFALL COMPONENTS.

Work-Environ.-Health, 6 (1):44-49, 1969. 12 refs.
Arvo Laamanen, and Timo Partanen.
Identifiers: *Dust fall, *Statistical analyses, Annual, Europe.

To determine whether annual dustfall averages could be estimated from only a few monthly values, regression analysis was applied to Finnish and Norwegian time series of total particle fall and Finnish series for dustfall components. The three months that resulted in the best estimates of total dustfall (TDF) were obtained by a stepwise regression routine, and the regression function for the Finnish series was applied to an independent control series. The linear correlation coefficient between the estimate and the true mean in the control series was 0.980. To calculate the estimated annual mean for components in the Finnish dustfall, the three months used to calculate the mean TDF were analyzed by least squares four-variable regressions. Correlation coefficients between estimates for nine groups of dustfall and components and true means in a control series were relatively high. However, the possibilities of applying the present results are likely to be restricted to ranges of variation and environment similar to the present data.
APTIC-24738

THE USE OF SNOW SAMPLES IN AIR POLLUTION STUDIES.

Work-Environ.-Health, 5 (1):42-50, 1968. 14 refs.
Arvo Laamanen.
Identifiers: *Area surveys, *Sampling methods, *Snow, Europe, Point sources.

In an investigation of air pollution in Finland, the distribution of impurities from point and area sources was measured by analyzing snow samples collected according to two methods. The first consists of collecting a layer of snow representing a fixed area and depth. The water value of this sample is determined, the water analyzed for impurities, and the results calculated per surface unit. The second collection procedure utilizes a white polyethylene plate placed horizontally on the snow. After about a month, the snow is removed from the surface of the plate and then treated as in the former method. With a radial type arrangement of sampling sites, the snow sampling technique is especially useful for studying the effects of a small, limited area source. The technique is also useful in situations where a point source emits special pollutants that are not otherwise formed to a great extent in the area being surveyed. Measurements based on the plate collection method represent limited local dustfall far better than those based on deposit gauges.
APTIC-24740

MEASURING GASEOUS EMISSIONS FROM AN AIRCRAFT TURBINE ENGINE.

Preprint, Society of Automotive Engineers, Inc., New York, 7p., 1970. 4 refs. (Presented at the National Air Transportation Meeting, New York, April 20-23, 1970, Paper 700249.)
J. O. Chase, and R. W. Hurn.
Identifiers: *Engine exhausts, *Jet aircraft, *Analytical methods, Aircraft, Gas turbines, Gas chromatography, Flame ionization detector, Mbth method, Sampling probes, Infrared spectrometry, Aldehydes, Hydrocarbons, Carbon dioxide, Carbon monoxide, Nitrogen oxides, Nitric oxide (no).

Experimental work is reported to define the character of turbine emissions, to gain experience in sampling and measuring these emissions, and to evaluate the adequacy of available instrumentation for this application. A Pratt and Whitney YTF-33 jet aircraft engine was used; the sample probe and procedures for sampling and testing are outlined. Analytical instrumentation was as follows: aldehydes - MBTH method; nitrogen oxides -phenoldisulfonic acid method; hydrocarbon distribution - gas-liquid chromatography; carbon monoxide, carbon dioxide, and nitric oxide - nondispersive infrared analyzer; and total hydrocarbon - flame ionization detector. Results showed that concentrations of gas phase pollutants in the turbine exhausts ranged from about one to three orders of magnitude lower than average concentrations of the same materials in exhausts of late model (1960-69) autos. Instrumentation now available for measuring hydrocarbon, CO, and oxides of nitrogen is expected to be adequate but will require appropriate adaptation for measurements at the lower concentrations typical for turbine exhausts. As is the case in automotive application, a method fully suitable for oxygenated materials is not yet available. Specific recommendations for future development of methods and instruments are made.
APTIC-24745

HIGH ALTITUDE RADIATION MEASUREMENTS. (QUARTERLY REPORT).

Michigan Univ., Ann Arbor, High Altitude
Engineering Lab., NASA Contract NASr-54 (03),
M. U. ORA Proj. 05863, 19p., Feb. 1970. 4 refs.
CFSTI: N 70 27312
Fred L. Bartman.
Identifiers: *Spectrometry, *Carbon dioxide, *Ozone, Spectrophotometry, Lower atmosphere, Middle atmosphere, Upper atmosphere.

Tests and modifications, prior to measurements of the 15 micron band of carbon dioxide, of a 1.8 meter spectrometer are reported. In addition, the development of a simple ozone generating and measuring system is discussed, and recent measurements of the distribution of CO2 in the atmosphere are summarized. The modified spectrometer is expected to produce less noisy high-resolution spectra than any previously reported measurements of CO2 absorption near 15 micron. This will yield significantly better estimates of band parameters, particularly for weaker overtone bands the lines of which are often overlapped by lines of more intense bands, or are lost in noisy data. Information obtained from analyses of the CO lines will be used in atmospheric applications, particularly in the remote sensing of temperature from satellites. The simplified ozonizer will use only pure oxygen as the broadening gas, but a reasonable range of O3 concentrations in O2 will be covered by controlling the time duration of the ozonizer operation. Ozone in the sample cell and room air will be measured with a SG-4 spectrophotometer modified for detection of ultraviolet absorption. Available information of the distribution of atmospheric CO2 indicates that concentrations are higher over the west coast than over inland areas, and that photosynthesis by land plants produces an intense sink for CO2.
APTIC-24753

RADIO FREQUENCY GAS CHROMATOGRAPHIC DETECTORS.

Florida Univ., Gainesville, Dept. of Chemistry,
Thesis (Ph.D.), Ann Arbor, Mich., Univ.
Microfilms, Inc., 1966, 79p. 10 refs.
Howard Person Williams.
Identifiers: *Radio frequency, *Gas chromatography, Instrumentation, Gases, Electrical properties.

A study was undertaken to evaluate two types of sensitive radio frequency gas chromatographic detectors. One detector uses the change in dielectric constant of a plasma as a means of detecting foreign gases in a carrier gas. Helium and argon are generally used as the carrier gases. Another means of monitoring changes in the plasma state occurring in a discharge cell involves a probe or probes immersed in the plasma. A probe will have a potential impressed on it depending upon its location in the plasma, and two probes unsymmetrically situated in the plasma space charge will give rise to a voltage between the two probes. Any change in the carrier gas results in a change in the number of electrons or ions and consequently a change in potential difference between the two electrodes is immediately noted when a foreign gas alters the steady state discharge. The response of the frequency detector was determined for the following gases: air, nitrogen, argon, carbon monoxide, hydrogen, carbon dioxide, oxygen, ammonia, nitrogen dioxide, sulfur dioxide, methane, chloromethane, ethane, n-propane, and n-butane. Working curves for the potential detector were determined for SO2, nitrous oxide, CO2, Ar, Co, air, N2, and H2. This detector was not as reproducible as the frequency detector. Limits of detection and useful dynamic concentration ranges are presented for both methods.
APTIC-24765

INVESTIGATION WITH THE ELECTRON MICROSCOPE OF AEROSOLS COLLECTED ON MEMBRANE FILTERS.

(Badanie mikroskopem elektronowym aerozoli
zebranych na filtry membranoew). Text in Polish.
Prace Central. Inst. Ochrony Pracy, 17 (54):233-
247, 1967. 11 refs.
Krystyna Rutkowska.
Identifiers: *Aerosols, *Membrane filters, *Electron microscopy, Europe, Dusts, Particles shape, Particle size, Crystal structure.

Experiments were performed to determine the most appropriate method of preparing aerosol samples collected on membrane filters for examination with the electron microscope. Conventional methods of dissolving the filter are described, from which a procedure was chosen in which the solvent is applied both in a standing and flowing layer. The required apparatus and working procedures are described. Measurements results using iron dust and mixed atmospheric dust are tabulated. The preparations thus obtained display good transparency and contrast, permitting the observation of particles which are invisible under the optical microscope. The identification of shape, size, and to some extent structure is feasible. (Author abstract modified)
APTIC-24770

AUTHOR'S REPLY TO THE PRECEDING DISCUSSION.

For primary bibliographic entry see Field 05.
APTIC-24774

A CONDENSATION NUCLEI COUNTER WITH AN EXPANSION PROGRAMME.

Vienna Univ. (Austria), Physikalisches Inst.,
NAPCA Grant AP 00468-03, p. 272-278 1969 (*). 5
refs.
Guenther Riediger.
Identifiers: *Nucleation, *Particle counters, Europe, Aerosols, Experimental equipment, Heat transfer, Vapors.

A condensation nuclei counter was developed which operates on the principle of an adiabatic expansion; the expansion cycle is governed by electronically timed solenoid valves. The expansion chamber and the humidifier are kept at 28 C by a thermostat; the temperature of the valves and the copper tubes is about 3 deg higher, to prevent losses of water vapor by condensation on he walls. Operation of the instrument is described and depicted. Measurements have been made with a propylene glycol aerosol and with a dioctylphthalate aerosol. Formation of the fog in the chamber and the beginning of re-evaporation were recorded both for the droplets with PG as well as with DOP nuclei by varying the delay time between the opening pulse for the expansion valve and the activation of the shutter.
APTIC-24780

MEASUREMENT OF AVERAGE PARTICLE SIZE IN AEROSOLS BY LIGHT SCATTERING.

In: Problems and Control of Air Pollution. F. S.
Mallette (ed.), New York, Reinhold, 1955, Chapt.
11, p. 107-120. 25 refs.
David Sinclair.
Identifiers: *Continuous monitoring, *Photometric methods, *Particle size, Aerosols, Automatic methods, Particulate classifiers, Design criteria, Mathematical analyses, Light scattering, Refractive index.

After reviewing light-scattering functions (total scattering, angular distribution, polarization, and intensity ratios), a new method is proposed for continuous measurement by light-scattering of predominant particle size in an aerosol of nonuniform particle size. In the proposed photometer, the aerosol is drawn continuously through two illumination chambers in quick succession. One chamber has dark-field illumination with a narrow cone of incident light. The source, a coiled tungsten filament, is focused on the aerosol stream through the chamber in a narrow pencil at right angles to the axis of illumination. After passage through the chambers, the aerosol is collected on a suitable filter for periodic weighing to determine mass concentration. A wide-angle full cone of illumination is used in the second chamber. The scattering from each chamber may then be measured simultaneously with separate photomultiplier tubes and recorded continuously. The normalized relative value of the two readings is a measurement of the particle size or sizes producing the dominant light-scattering effect. The procedure for calculating performance are developed. The method provides in situ measurements with a minimum of disturbance, is rapid, can readily be made automatic and continuous, and partly overcomes earlier difficulties in using light-scattering by finding a function (the intensity ratio of near-forward to right-angle scattering) that increases with particle size over a considerable range. Limitations of the method are also discussed.
APTIC-24791

CHEMISTRY OF SMELL.

(Nioi no kagaku). Text in Japanese. Eisei Kagaku
(J. Hyg. Chem.), 16 (5):235-240, Oct. 31, 1970. 5
refs.
Toshiichi Okita.
Identifiers: *Gas chromatography, *Odorimetry, *Trapping (sampling), Thresholds, Japan, Odors, Infrared spectrometry, Ammonia, Methanes, Mercaptans, Sulfides, Reaction mechanisms.

Various theories on the mechanism of sense of smell are described, but there is no definite experimental method of confirmation yet established, which calls for a more biological explanation. Analyses by the use of instruments, started only recently, and was made possible with the development of gas chromatography. Threshold values and odor descriptions for some 50 chemicals are listed. Various methods of trapping a gas were investigated. Organic solvents such as alcohol, acetone, or ethylbenzene, are cooled with a dry ice-acetone refrigerant, trapping the gas with a 1 liter/min flow and introducing a part of it for gas chromatography. In a second glass method glass beads fill a U-tube which cooled with liquefied oxygen; the gas is introduced at the rate of 0.3 l/min. After the gas is trapped, the tube is fixed in the gas sampling equipment for gas chromatography. In a third method, trapping the gas with a filter, such reagents as mercury salt for mercaptan and sulfide and sulfuric acid for amines, etc., are coated on the filter. Odorous gases are trapped on the filter, the gas is separated and condensed, and either the first or second method is adopted for measurement. Infrared absorption spectra were used to identify mercaptans, sulfides, ammonia, and methane from the gas emanating from feces were identified.
APTIC-24814

THE OPTIMAL NUTRITION MEDIUM OF MYCELIAL BIOMASS IN THE ANALYSIS OF BACTERIAL AIR POLLUTION.

(Optimal'naya plotnaya pitatel'naya sreda iz
mitselial 'noy biomassy dlya issledovaniya
bakterial'nogo zagryazneniya vozdukha). Text in
Russian. Gigiena i Sanit., 35 (8):107-108, 1970.
G. P. Kirsanov.
Identifiers: *Bacteria, Humans, Diseases and disorders, Ussr, Analytical methods.

Data from chemical analysis of a high-purity mycelial biomass obtained in large quantities as a byproduct of industrial fermentation involving P. chrysogeaum are presented. A nutrient medium extracted from the mycelial biomass was used to culture air samples taken in infectious wards of a hospital, and 25 strains of microorganisms were isolated from 172 air samples. Specific determinations of dysentery and diphtheria were achieved using this medium.
APTIC-24838

THE USE OF SILOXENE FOR DETERMINING SMALL AMOUNTS OF NITROGEN DIOXIDE.

(Primeneniye siloksena dlya opredeleniya
nebol'shikh kolichestv dvuokisi azota). Text in
Russian. Zh. Analit. Khim. (Moscow), 25 (7):1309-
1313, July 1970. 13 refs.
Kh. I. Agranov, A. S. Klimentov, L. V. Reiman,
and V. L. Shcheglov.
Identifiers: *Siloxene, *Nitrogen dioxide (no2), *Phosphorescence, Ussr, Automatic methods, Design criteria, Silicon compounds, Flow rates.

Chemiluminescence of siloxene (Si6H6O)n was used in a laboratory arrangement to detect nitrogen dioxide in gas mixtures at a flow rate of 1 l/min. Automatic detection of NO2 at concentrations of 0.000001 to 0.00007 vol % in nitrogen was demonstrated. Preparation of siloxene is described, and a functional diagram of the analyzer is presented and discussed. The quantum yield from reaction with NO2 was established at about 0.000127 photon/molecule.
APTIC-24839

DETERMINATION OF DUST FALL WITH GLASS FILTER PANS.

(Bestimmung des Staubausfalls mit
Glasfiltertiegeln). Text in German. Z. Meteorol.,
vol.17:154-158, 1965. 5 ref.
H. Mrose.
Identifiers: *Germany, *Dust fall, *Samplers, *Glass fabrics, Air quality measurement programs, Annual, Urban areas, Industrial areas, Chemical composition, Collectors.

Results of dust fall measurements during the period 1957-1960 are reported as a continuation of a new type of testing begun in 1956, with a measurement network extending across all of East Germany. Glass pans, 47 mm in diameter and 35 mm deep, were used for the collection of samples; these had bottoms made of a porous material, so that the pan could be used for filtering and then for weighing the filter residue. The bottoms, which were of varying degrees of porosity, were made of fritted glass. The results reported represent the averages of four yearly values, since individual measurements varied widely. The locations registering the highest dust fall (over 20 mg per square meter per month) were Leipzig, Schwerin, Potsdam, Warnemuende, Aschersleben, Leuna-Werke, and Bitterfeld. The organic content of the dust was analyzed in terms of its potassium dichromate consumption. The highest values (over 40 mg of dichromate per sample) were obtained at Schwerin, Goldberg, Hoyerswerda, Bitterfeld, Leipzig, Aschersleben, and Leuna-Werke, in an ascending order of values. The Leuna-Werke figure was 85.6 mg. Results are also reported of measurements made at Freiburg im Breisgau, in the southwest corner of West Germany in 1959, which was supplemented by a more extensive study extending from Mannheim to the resort areas of the Black Forest. Heavy industrial centers of East Germany were studied with the use of large funnels filled with water as sample collectors. The relative merits of the glass pans and the funnels as collecting devices are examined.
APTIC-24861

WIND DIRECTION, VELOCITY AND TURBULENCE INSTRUMENTATION FOR AIR POLLUTION DIAGNOSIS.

Preprint, American Smelting and Refining Co.,
Salt Lake City, Utah, 10p., 1953 (*). 5 refs.
M. D. Thomas, and James O. Ivie.
Identifiers: *Meteorological instruments, *Dispersion, *Winds, *Turbulence (atmospheric), Monitoring, Design criteria, Anemometers, Temperature (atmospheric), Lapse condition, Sulfur dioxide.

Dispersion of pollutants in the air is largely a function of the atmospheric structure, and the principal meteorological factors that need to be measured concomitant with chemical data are wind direction, wind velocity, and turbulence. Other useful factors would be air temperature, lapse rate, and insulation. Recording wind velocity requires merely a pen-carrying relay which makes a 'pip' on the chart from contacts on a three-cup anemometer, with each mile or fractional mile of wind travel. Leeds and Northrup Co. are incorporating a simple arrangement to determine wind direction in their new sulfur dioxide recorders. It has 4 contacts actuated by an assembly of four 135 deg cams on the shaft of the wind vane. These cams overlap so that in 4 alternate half-quadrants, single contacts are made and in the intervening half-quadrants double contacts are made. The contacts on the vane cause one or two of the pens at a time to be drawn to a new position, indicating wind direction to 45 deg. Two methods which are employed of determining wind direction and velocity in a number of strip-chart SO2 recorders are also described. Turbulence can be recorded by adding up the to-and-fro movements of a horizontal vane or both the to-and-fro and up-and-down movements of a bivane. The four general patterns of dispersion which are recognized by the Brookhaven Meteorologists are indicated.
APTIC-24862

GALVANIC APPARATUS FOR THE STUDY OF GASES. II. CONTINUOUS DETERMINATION OF SMALL AMOUNTS OF CHLORINE IN GASES.

(Galwaniczny aparat do badania gazow. II. Ciagle
oznaczanie malych ilosci chloru w gazach). Text in
Polish. Chem. Anal. (Warsaw), 12 (4):877-888,
1967. 14 refs. (Presented at the Kongresie
Miedzynarodowym Chemii Przemyslowej, 35th,
Warsaw, Poland, 1964.)
Jerzy Waclawik, and Stefan Waszak.
Identifiers: *Potentiometric methods, *Chlorine, Europe, Bromine, Iodine, Ozone, Flow rates, Ionization, Ions, Gases, Electrical properties.

A new method for determination of small quantities of chlorine in gases was developed. A galvanic cell is proposed consisting of a gold electrode, where chlorine, dissolved in electrolyte, is reduced to chloride ion, and a silver electrolyte, which is oxidized to silver ion. A solution of potassium chloride in hydrochloric acid was used as an electrolyte, which circulates in the cell in a closed system. The current in this cell depends on the concentration of chlorine only and is proportional to it. The regeneration of Ag electrode is accomplished through its cathode reduction. The cell is suitable for determination of small quantities of Cl2 in nitrogen, noble gases, hydrogen, CO2, air and other gases that do not react with the electrolyte or electrode material. The method can be used also for determination of ozone, bromine, iodine in the air. When 2 recorder with Fe-constant thermocouple is used, 0.00-3.00 ppm of Cl2 can be determined with an accuracy 0.3 ppm at a gas flow velocity of 100 ml/min. When a compensation potentiometer is used, 0.00-1.5 ppm can be determined with accuracy .02 ppm.
APTIC-24863

PARTICLE COUNTING TECHNIQUES AVAILABLE FOR AEROSOL RESEARCH.

J. Air Pollution Control Assoc., 18 (10):657-659,
Oct. 1968.
H. M. Ogle.
Identifiers: *Aerosols, *Particle counters, Photometric methods, Particle size, Design criteria, Light scattering, Flow rates.

Two practical types of instruments are now available for aerosol research, one employing right angle scattering of light to count and size very small airborne particles, and the other employing near-forward scatter light for the same purpose but operating at much higher flow rates. The optical systems of both types of counters are schematically illustrated. In the right angle scattering instruments, particles present in an airstream are directed to a photomultiplier tube which converts the pulses of light generated by passage of the particles to electronic signals. A typical instrument will measure particles from 0.3 to 10 micron, but the range of some instruments extends up to 100 micron. Simultaneous measurement of both large and small particles is limited to a dynamic range of approximately 30 to 1. In near-forward scatter instruments, a light trap is placed concentric with the collection system and special light baffles are arranged to optimize optical signal-to-noise ratio. Small variations in particulate concentration are rapidly observed with this system, which counts all the particles in cu ft of air every minute. Because these instruments can handle large particles as the result of their high flow rates, they also have the dynamic range necessary for simultaneous measurements of large and small particles. However, their ability to count particles below 0.5 micron in diameter is limited.
APTIC-24873

DEVELOPMENT AND TESTING, WITH STANDARDIZED MIXTURES AND ON A VAPOR GENERATOR, OF AN INSTRUMENT FOR MEASURING SO3 IN COMBUSTION PRODUCTS.

(Razrabotka, oprobovaniye na etalonnykh
smesyakh i parogeneratore pribora dlya
izmereniya SO3). Text in Russian. Izv. Akad.
Nauk SSSR, Energ. Transp., 5:142-146, Sept.,
Oct. 1969. 2 refs.
A. K. Baukov, Ye. I. Volkova, L. A. Goykhman,
and L. M. Kofman.
Identifiers: *Sulfur trioxide, *Stack gases, *Measurement methods, Ussr, Boilers, Chemical methods, Filters, Sulfuric acid, Condensation, Temperature.

An instrument, utilizing selective condensation at about 80 C in a thermostated coil and designed to determine SO3 concentration in flue gases, was tested. Condensation droplets are trapped on a glass filter and the coil is eluted after each sampling. The quantity of sulfuric acid thus collected is then determined by titrimety, analysis requiring 3 min. Testing with standardized gas mixtures generated by controlled combustion of methane showed good convergence of the results. Use of the instrument on a boiler showed a clear relationship between air excess and SO3 concentration. Instrument operation is reliable and only simple maintenance is required.
APTIC-24879

EFFECT OF COLD STORAGE ON THE FLUORIDE CONTENT OF ALFALFA.

J. Agri. Food Chem., 5 (5):377-379, May 1957. 4
refs.
Charles P. McCarty, and Elmer Robinson.
Identifiers: *Fluorides, *Storage, *Alfalfa, *Chemical composition, Standards, Temperature.

The tediousness of determinations of fluoride in vegetation samples, coupled with a frequent need to gather a large number of samples in a short time, usually requires storage of samples prior to analysis. Tests using alfalfa samples were conducted to determine the effect of storage at O F for four to six weeks on fluoride content. Stored samples showed more variation than unstored samples but no consistent change in fluoride content. The variation can be reduced by adding lime to stored samples. Samples stored in a tight container do not gain or lose moisture consistently. (Author abstract)
APTIC-24886

NEW METHOD OF LIGHT MODULATION FOR DUAL-BEAM PHOTOMETERS AND SPECTROPHOTOMETERS.

(Novyy metod modulyatsii svetovykh puchkov v
dvukhluchevykh fotometrakh i
spektrofotometrakh). Text in Russian. Tr. Gl.
Geofiz. Observ. (Leningrad), no. 213:25-36, 1968.
8 refs.
V. I. Goryshin.
Identifiers: *Mathematical analyses, *Light radiation, *Spectrophotometry, *Photometric methods, Ussr, Instrumentation.

A radially slotted modulating wheel, designed to modulate light for use with the author's so-called method of carrier-frequency modulation, is described. A method is presented for calculating modulation parameters and amplitude characteristics for this system. Phase relationship considerations are then treated theoretically. This is followed by an examination of design considerations pertinent to the required light-compensator amplifier. Material presented in this article were used to design a high-accuracy automatic compensation photometer, intended for continuous field measurement and recording of atmospheric transparency, which is now being mass produced.
APTIC-24897

CONTINUOUS SAMPLING AND ULTRAMICRODETERMINATION OF NITROGEN DIOXIDE IN AIR.

Anal. Chem., 30 (3):426-428, March 1958. 16 refs.
Morris B. Jacobs, and Seymour Hochheiser.
Identifiers: *Nitrogen dioxide (no2), *Colorimetry, *Continuous monitoring, Sulfur dioxide.

Nitrogen dioxide is determined in air in the presence of much higher concentrations of sulfur dioxide on an hourly basis by using an automatic 24-hr sampler. Air is aspirated through a fritted-glass bubbler containing 0.1N alkali solution. The absorbed nitrogen dioxide is determinned colorimetrically as the azo dye by using it to diazotize sulfanilamide in phosphoric acid and then coupling it with N- (1-napthyl)-ethylenediamine dihydrochloride. Nitrogen dioxide in the order of pphm of air can be determined. The sulfur dioxide present is also absorbed, but when oxidized to sulfate with hydrogen peroxide does not interfere with the reaction. (Author abstract)
APTIC-24900

SIMULTANEOUS DETERMINATION OF CARBON AND SULFUR IN ORGANIC COMPOUNDS BY GAS CHROMATOGRAPHY.

Anal. Chem., 34 (12):1671-1672, Nov. 1962. 1 ref.
Donald R. Beuerman, and Clifton E. Meloan.
Identifiers: *Carbon dioxide, *Sulfur dioxide, *Gas chromatography, Experimental methods.

Under the proper conditions, carbon dioxide and hence the carbon in organic compounds can also be separated and determined quantitatively with the determination of sulfur by gas chromatography. A 20-foot column of 30% dinonylphthalate on Chromasorb W, conditioned for at least one day at 95 C, separated the oxygen from the carbon dioxide and provided sufficient time between the CO2 peak and the sulfur dioxide peak to allow for electrical equilibrium when the attenuation was changed. The detector used consisted of a thermal conductivity cell using 2000-ohm thermistors. When using 02 at 10 to 12 ml per minute flow rate during the combustion step, it was necessary to use liquid nitrogen to trap the SO2 quantitatively.
APTIC-24901

EFFECT OF ATMOSPHERIC CONTAMINANTS ON LIGHTFASTNESS TESTING.

For primary bibliographic entry see Field 09.
APTIC-24906

RADIOACTIVE COPPER AS AN ATMOSPHERIC TRACER.

Preprint, American Society of Agricultural Engineers, Saint Joseph, Mich., 33p., 1964. 4 refs. (Presented at the American Society of Agricultural Engineers, Winter Meeting, New Orleans, La., Dec. 8-11, 1964, Paper 64-823.) NTIS: BNL-8645
Gilbert S. Raynor.
Identifiers: *Dispersion, *Copper compounds, *Radioactive tracers, Tracers, Isotopes, Beta particles, Gamma radiation.

Techniques and instruments were developed for the use of radioactive copper as a tracer in studies of diffusion and dispersion through the atmosphere and of deposition on the ground and vegetation. Copper in the form of solid, spherical particles (2-12 micron in diameter) or in a soluble compound is activated by exposure to slow-neutron flux to produce Cu (54). The particles suspended in a liquid and the compounds in solution are emitted to air by atomizing nozzles. Air concentrations are measured by filter or rotating impactor samplers. Material deposited on the ground and vegetation is measured by mobile radiation counters, sticky paper collectiors, autoradiographs on X-ray film, or actual soil and plant samples. Both beta and position annihilation gamma counting are utilized in analyzing the filters and other samples. Instrument calibration techniques and safety procedures have been established. (Author abstract modified)
APTIC-24914

STUDY OF ATMOSPHERIC AND AAP OBJECTIVES OF CROSS-BEAM EXPERIMENTS. (FINAL REPORT).

Midwest Research Inst., Kansas City, Mo., Contract NAS 8-21065, Rept. NASA CR-61191, 200p., Feb. 1968. 100 refs. CFSTI: N68-17200
A. D. St. John, and W. D. Glauz.
Identifiers: *Photometric methods, *Fluid flow, Lower atmosphere, Winds, Clouds, Turbulence (atmospheric), Light scattering.

A remote photometric probing method for the sensing of fluid flow phenomena, called the cross-beam technique, is studied to determine its potential value in resolving meteorological and atmospheric problems. The study was designed to identify atmospheric problem areas whose resolutions have scientific importance; to appraise the value of the cross-beam technique under ideal and non-ideal conditions; to determine the data requirements; and to codify all these parameters in a ranking system. In general, information is required about the transport and diffusion of energy and moisture. The measurements of convection speed and turbulence characteristics, ideally available from the cross-beam technique, would have great value especially if they could be combined with temperature and moisture measurements. Reduced but appreciable value could be derived from the ideal cross-beam measurements by themselves. Even the ability to measure remotely one component of convection velocity would in some cases be very valuable There are two considerations in the amount of data required. First, it is obvious that the quantity will depend on the geographical size of the problem, the number of grid points, the types of information required, and the temporal duration of the problem. There is also the question, how much data must be obtained at one point (or region) to define the flow properties to a suitable degree of confidence" An analysis was made of the flow of electromagnetic energy in a beam through the atmosphere. The present, two-beam technique is defeated when the beams 'see' successive regions of a variably lighted or variably emissive background such as a cloud surface or the earth's surface. Access to the lower atmosphere may be made from the ground, aircraft or orbit-based equipment. In general those systems which look at the earth have less desirable signals as a result of the back light energy input. (This is a separate consideration from the currently disbarring effect associated with variable back lighting.) Weather conditions and primary light sources can combine favorably or unfavorably so that the required power variations change by at least two orders of magnitude. Separate ranking tables are presented for ground-based systems, aircraft-based systems, and orbit-based systems. The scientific and operational applications are also separately ranked. The rankings in one table cannot be compared numerically with those in another table. (Author summary modified)
APTIC-24924

INSTRUMENTATION AND ANALYTICAL TECHNIQUES FOR THE CONTINUOUS DETERMINATION OF AIR CONTAMINANTS.

Am. Soc. Texting Mater. Proc., vol. 53:1136-1159, 1953. 40 refs. (Presented at the American Society for Testing and Materials, Annual Meeting, 56th, June 28-July 3, 1953.)
Morris Katz, and George D. Clayton.
Identifiers: *Detroit, *Analytical methods, *Continuous monitoring, *Instrumentation, Air quality measurement programs, Particulates, Settling particles, Suspended particulates, Chemical composition, Dust fall, Gases.

The great variability in the degree of contamination of the atmosphere is brought about by the interplay of meteorological and topographical factors. These cause the pollution load to vary with the time of day and season of the year. Continuous instrumentation and analytical techniques are therefore necessary to obtain an adequate picture of the variation in intensity of gaseous and aerosol contaminants over a given city or industrial areas. In the Windsor-Detroit area, the environment is being assessed on a continuous basis by sampling for dustfall, suspended particulate matter, and gaseous pollution. The work is supplemented by chemical analysis and identification of as many major pollutants as possible. The instruments and techniques employed are described in detail. Apart from a few gases such as sulfur dioxide, hydrogen sulfide, and hydrogen fluoride, the methods are decidedly limited. Most of the continuous methods used for gaseous pollutants are not specific for a particular type of compound. It is hoped that in the future polarographic methods can be made specific for certain gases. With aerosols the best that can be done is to collect them on a continuous basis and analyze for certain chemical constituents separately. Much can be learned from the evaluation of the mass concentration, particle size distribution, and chemical identification of a portion of the complex materials. In this connection, X-ray diffraction is proving a valuable tool in he identification of crystalline material present in the Windsor-Detroit area.
APTIC-24927

ATMOSPHERIC OZONE.

Advan. Geophys., vol. 11:115-173, 1965. 112 refs.
Arlette Vassy.
Identifiers: *Measurement methods, *Altitude, *Ozone, France, Atmospheric movements, Light radiation, Infrared radiation, Ultraviolet radiaton, Temperature.

A general outline is presented of atmospheric ozone with special attention to recent discoveries and measurements of special interest to geophysicists. It is noted that ozone provides meteorologists with a convenient method of studying air masses in the stratosphere; it helps in measuring some of their physical properties, such as temperature and pressure, and it may be used as a natural tracer for their movements. Ozone is also of interest in dynamic meteorology. This rare gas plays an important part in the heat budget of the atmosphere because it absorbs both terrestrial infrared and solar ultraviolet radiation. In this respect, ozone acts as a reservoir, the ultraviolet energy being stored and delivered at a slower rate after its conversion to infrared energy. Ozone is responsible for the relatively high temperatures in the mesosphere and also for the stabilization of these temperatures. Thus, in meteorology, ozone is not only a research tool but also a factor in equilibrium. Atmospheric ozone can be considered from several points of view. Attention can be given to the total amount of ozone in the atmosphere above an observation site, or to its mean temperature; these features characterize stratospheric air masses. For local climatology, measurements of the general ground level (or surface) concentrations are important. Finally, vertical distributions of ozone and variation of concentration with height can be measured.
APTIC-24929

DETERMINATION OF POLLUTANTS IN INDUSTRY WITH THE USE OF MINE INTERFEROMETER.

(Stanoveni skodlivin v prumyslu dulnim interferometrem). Text in Czech. Chem. Prumysl (Prague), 18 (2):104-105, 1968.
Jiri Zagmen.
Identifiers: *Photometric methods, *Refractive index, Portable, Czechoslovakia, Gases, Pressure, Temperature.

The principles of operation of a portable interference refractometer DI-2 of Czechoslovak production, suitable for determination of pollution content in the atmosphere are explained. The concentration of pollutants, proportional to the difference between an index of refraction of a standard and measured atmosphere, is determined from the shift of the interference figure in the optical system of the instrument from the zero position. The measurable concentration range and error of the measurement are inversely proportional to the length of the sample cell. For DI-2 with a cell length of 100 mm, the maximum measurable concentrations are compared for several gases. They range from 1.0 to 35.0%. The method is not selective. Its application in cases of various gas mixtures is discussed as well as the effect of temperature or pressure changes. In the case of a 10 C temperature change, the error is not higher than 50% of maximum error of measurement.
APTIC-24938

MODERN METHODS OF MONITORING GASEOUS PULP MILL EFFLUENTS FOR SULFUR COMPOUNDS.

Advan. Automated Anal., 1970:111-114. 30 refs. (Presented at Technicon International Congress on Automated Analysis, Chicago, Ill., June 4-6, 1969, Paper 691-52.)
Richard B. Kesler.
Identifiers: *Kraft pulping, *Analytical methods, *Sulfur compounds, Operating variables, Gas chromatography, Colorimetry, Spectrophotometry, Monitoring, Electroconductivity analyzers, Organic sulfur compounds, Mercaptans, Sulfur dioxide, Sulfides, Hydrogen sulfide.

A search of technical and manufacturers' literature was undertaken to discover and assess recent methods and instruments used to monitor gaseous pulp mill effluents for sulfur compounds. The compounds of interest are sulfur dioxide, hydrogen sulfide, methyl mercaptan, dimethyl sulfide, and dimethyl disulfide. The accuracy, sensitivity, selectivity, cost, maintenance, and suitability for long-term monitoring with respect to response time, stability, and frequency of service required is evaluated for each of the following methods: colorimetry, coulometry, direct spectrophotometry, and gas chromatography. Colorimetric and gas chromatographic methods seem applicable mainly when an occasional manual analysis is to be made. Coulometric devices offer specificity, sensitivity, and capability for long-term continuous monitoring with remote read-out, while direct spectrophotometry, particularly for the infrared and ultraviolet determination of SO2, is perhaps the most simple and suitable method for long-term, quick-response monitoring.
APTIC-24939

AN IMPROVED CONTAMINANT SENSING TECHNIQUE FOR LABORATORY AND SPACECRAFT APPLICATION.

Proc. Conf. Atmos. Contamination Confined Spaces, 4th Annu., Wright-Patterson AFB, Ohio, 1968, p. 337-346, 3 refs. (Sept. 10-12; Paper 23 discussion included.) CFSTI, DDC: AD-855-001
D. C. Popma, and W. C. Easley.
Identifiers: *Gas chromatography, *Controlled atmospheres, *Mass spectrometry, Computer programs, Design criteria, Experimental methods.

A laboratory contaminant sensing technique is outlined that shows considerable promise for the measurement of many toxic compounds that may be present simultaneously, in a breathable atmosphere. In April 1967, the Langely Research Center undertook a study and test program with the Perkin-Elmer Aerospace Systems Company to develop a sensing technique which would combine the best features of both gas chromatography and mass spectrometry. The approach of this 'hybrid' sensor program is to use gas chromatograph column sorber materials, such as the Porapaks, charcoal, and molecular sieves, to preconcentrate the trace contaminants, and thus increase the sample quantity available to the mass spectrometer. Because of the increased sample quantity from these preconcentrators, it is possible to use a very low ionization potential in the mass spectrometer. Finally, in order to aid in the gathering and analysis of the data, a digital computer program was written which will greatly simplify the use of this instrument.
APTIC-24959

TESTING PROCEDURES AND EQUIPMENT.

Am. Foundryman, 19 (3):53-55, March 1951. 9 refs.
George E. Tubich.
Identifiers: *Primary metallurgical processing, *Sampling methods, Stack gases, Dusts, Cupolas, Electric furnaces, Trace analysis.

The basic principle of sampling air for contamination, both inside and outside the foundry, is closely related to the degree of concentration and the specific character and behavior of the contaminant or pollutant. Air pollutants discharged by foundries are dusts from grinding, shakeouts, sand conditioning, blasting and other dust producing or liberating operations; other sources of pollution are cupolas, electric arc furnaces and other types of melting equipment. Types of sampling required are stack or duct samples to determine the amounts and characteristics of emissions, and samples of the general atmosphere to determine the extent of air pollution and its effect on the area or community involved. Particulate matter collection methods are presented tabularly, including their advantages and limitations. These include electric precipitation, thermal precipitation, impingement, and mechanical filtration. Gaseous matter collection methods are also listed for high concentrations as well as trace amounts. Problems associated with sampling cupola gases are cited, and velocity adjustment for sampling is mentioned.
APTIC-24960

RELATIONSHIP OF RESULTS OF LONG-TERM TOXICITY STUDIES TO THOSE OF SHORTER DURATION.

Proc. Conf. Atmos. Contamination Confined Spaces, 4th Annu., Wright-Patterson AFB, Ohio, 1968, p. 93-101. 4 refs. (Sept. 10-12; Paper 8, discussion included.) CFSTI,DDC: AD-855 001
Carrol S. Weil.
Identifiers: *Minimum effect dosage levels, *Toxicity, Diagnosis, Research methodologies.

The inter-relationships of the toxicity results between studies of varying duration is important for two reasons: first, so that the results of short term studies may be used to plan more accurately the dosage levels for longer term studies; and, secondly, to use short term studies in place of the long term if experience illustrates that a reliable relationship exists between such experiments. A formula is presented which has proved valuable in the prediction of joint toxic action of combinations of materials by inhalation and by peroral dosing when their action is additive. Also, the toxicities of these mixtures by these routes were positively correlated. Results of a comparison among 33 subacute and long term feeding studies are summarized, indicating that body weight change, weight and pathology of the liver and of the kidney were the efficient criteria. Additional experiments were performed recently, using 22 chemicals, to determine whether the results of LD50s or 7-day feeding studies could be used to predict the outcome of 90-day feeding studies. The quantitative relationship between the LD50s and the 90-day minimum effect dosage level (MiE) was relatively poor; the LD50s and 7-day MiEs were somewhat better related. However, 95% of the ratios between the 7-day and 90-day minimum effect dosage levels were 6.8 or less, a 6-fold improvement from the 90-day estimate allowed by the LD50s.
APTIC-24963

THE MICRODETERMINATION OF FLUORIDE IN VEGETATION.

Air Pollution Control Assoc. J., 19 (6):439-442, June 1969. 16 refs.
M. D. Thomas, and R. E. Amtower.
Identifiers: *Leaves, *Colorimetry, *Fluorine compounds, Chloroplasts, Diffusion, Sodium hydroxide, Combustion.

The determination of fluorine in vegetation is generally carried out by a modification of the Willard-Winter method. This method gives satisfactory results, but it is rather laborious and time-consuming and requires considerable equipment. For microchemical work on very small vegetation samples or fractions such as chloroplasts, in which the total fluorine available is usually of the order of a few micrograms, other techniques are required. A micro method for the determination of the fluoride content of plant materials, particularly the leaves, is described. The samples are dried and ground to a fine powder. Fifty mg samples are burned in oxygen in 250-ml separatory funnels or in 300-ml Erlenmeyer flasks. The gaseous products of the combustion are absorbed in 0.1N sodium hydroxide in the closed funnel or flask and transferred to a small covered plastic dish in which the fluoride is diffused to tiny droplets of 3N sodium hydroxide solution distributed over the lower side of a tight fitting cover. The diffused fluoride is dissolved in water and determined colorimetrically by the SPADNS reagent. The sensitivity of the method is directly proportional to that of the SPADNS dye used to measure the fluoride.
APTIC-24966

A METHOD FOR TESTING HIGH EFFICIENCY MECHANICAL FILTERS FOR THE SEPARATION OF RADIOACTIVE AEROSOLS AND FOR PERSONAL PROTECTION.

For primary bibliographic entry see Field 02.
APTIC-24967

ANALYTICAL METHODS USED TO DETERMINE DAMAGE BY ACIDS IN THE ATMOSPHERE.

(Die chemische Untersuchungsmethoden des Luftsaeureschaedenexperten). Text in German. Chemiker-Zeitung, 51 (45):429-433, June 8, 1927.
R. Heilingoetter.
Identifiers: *Chemical methods, *Gas sampling, *Inorganic acids, Trees, Plant damage, Toxic tolerances, Germany, Acid smuts, Hydrochloric acid, Hydrofluoric acid, Nitrous acid, Sulfuric acid, Ammonia, Chlorine, Fluorine, Hydroxides, Calcium compounds, Carbon dioxide, Nitrogen oxides, Nitrogen dioxide (no2), Sulfur dioxide, Sulfur trioxide.

The three methods available for the assessment of damage caused by atmospheric acids are the so called leaf and needle ash analysis which directly measures damage caused to plants, atmospheric acid analysis by which the harmful content of acids can be measured on the spot and the qualitative determination of small quantities of acid in the atmosphere. The first method is based on the accumulation of acid in the exposed plants. In the ash of such exposed plant material (needles of conifers for example) water-soluble sulfuric acid, chlorine, fluorine, and nitrogen are determined and the excess over normal levels is calculated. The second method, analyzing air acidity directly, uses a series of absorption bottles filled with different absorbent liquids designed to retain carbon dioxide,

sulfur dioxide, sulfur trioxide, nitrogen oxides, ammonia, chlorides and hydrochloric acid which are then measured by appropriate analytical methods and the respective acidity is calculated. Toxicity limits are for SO2 3 mg/cu m, for N2O4 50 mg/cu m, for NH3 30 mg/cu m, for HCl 110 mg/cu m, for Cl2 64 mg/cu m and for HF 0.00033 vol %. The qualitative method uses cotton cloth dipped in a barium hydroxide solution and in lime water to determine the presence in the atmosphere of SO2 and of F respectively.
APTIC-24970

LIGHT-SCATTERING METHOD OF MEASURING AEROSOL PARTICLES.

(Streulicht-Messverfahren fuer Aerosole). Text in German. In: Jahrbuch der Fraunhofer-Gesellschaft 1968/1969, Fraunhofer-Gesellschaft, Munich, West Germany, p. 15-20, 1969.
F. J. Moenig.
Identifiers: *Aerosols, *Measurement methods, *Light scattering, Germany, Photometric methods, Particle size, Design criteria, Electrical measurement devices, Instrumentation, Photoelectric phenomena.

Scattered light emitted by each single aerosol particle is channelled by a system of lenses into a photo multiplier which converts each light impulse into an electrical impulse which is proportional to the intensity of the scattered light and thus proportional to the particle size. The impulses are amplified and sorted electronically. A new sorting system which sorts all impulses simultaneously by means of a multichannel analyzer changes the impulses issuing from the photo multiplier so that they meet the requirements of the multichannel analyzer the approximately 300 microsec, impulses of the scattered light system are reduced to 5 microsec without a change of amplitude which represents the parameter characterizing particle size). The conversion is accomplished by a supplemental impulse converter which first amplifies incoming impulses in a linear manner then prolongs them after they have attained their maximal time-related value. By a Schmitt trigger, only impulses exceeding a selected amplitude are prolonged. The prolonged impulses are fed into a linear gate which passes them each 5 microseconds on to the multichannel analyzer. This arrangement makes it possible to receive a particle-size spectrum within a few seconds which can be observed on a screen of a picture tube. A dilution system is described which makes possible the measuring of particles of high density. Even though the resolution power of this measuring system is limited, it is suited for the routine measuring of aerosols of known particle size distribution.
APTIC-24974

SPECTROCOLORIMETRIC DETERMINATION OF HEXACHLOROCYCLOHEXANE IN THE ATMOSPHERE.

(Dozarea hexaclorciclohexanului in atmosfera prin metoda spectrocolorimetrica). Text in Rumanian. Rev. Chim. (Bucharest), 18 (9):565-566, 1967. 7 refs.
I. Grigorescu, and L. Bengeanu.
Identifiers: *Pesticides, *Colorimetry, *Spectrophotometry, *Hexanes, Europe, Gas sampling, Nitric acid, Ethyl alcohol, Ammonium compounds, Chlorides, Cyanides, Chlorinated hydrocarbons, Toluenes, Hydroxides, Iron compounds, Mercury compounds, Sodium hydroxide, Organic sulfur compounds, Sulfates, Flow rates.

This broad-spectrum insecticide is finding an increasing use, so that accurate detection measures are necessary for its proper control. A method has been adapted by the Central Toxicology Laboratory of the Rumanian Ministry of Chemical Industries, which makes use of chloride-free toluene, sodium hydroxide dissolved in 0.1 N ethyl alcohol, a 1% solution of ferric ammonium sulfate in 15% nitric acid, a 0.1% solution of mercuric sulfocyanide in 96% ethyl alcohol, and a standard solution of HCH prepared by dissolving 0.5 g of lindane in 100 cc of toluene, from which a working standard is prepared by dilution, which contains 500 micrograms per cubic centimeter of HCH. Air samples are collected with an impinger containing 100 cc of toluene, through which the air is caused to flow at the rate of 10-15 cu m /minute, the total volume of the sample being dependent on the suspected amount of atmospheric HCH, on the average about 10 cu m. Given the extent of the sample-collecting time, the presence of chlorine and inorganic chlorides in the atmosphere will not create interference with the determinations, but special care must be taken to eliminate all chloride impurities from the reagents used. Testing of the method indicates that the margin of error can amount to plus or minus 10%, with an average error of 3%. The amount of time required for determination is 20 minutes, on the average.
APTIC-24975

THE DETERMINATION OF HEAVY METALS IN DUSTFALL BY ATOMIC-ABSORPTION-SPECTROPHOTOMETRY.

(Genshi kyuko bunsekiho niyoru koka baijinchuno junkinzoku no teiryo). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4 (2):182-187, Nov. 1970. 14 refs.
V. Sugawara, and V. Yamazaki.
Identifiers: *Dust fall, *Spectrophotometry, *Metal compounds, Japan, Fly ash, Copper compounds, Iron compounds, Lead compounds, Zinc compounds.

Atomic-absorption-spectrometry was used for the determination of metals in several materials. In one application, the elements of iron, copper, lead, and zinc in dustfall (ash) were determined. For this purpose, the extraction or addition of organic solvents or dilutants was used, since analysis sensitivity is enhanced. The results of a dilution experiment are presented. Dustfall was treated with nitric, hydrochloric, and perchloric acids and mixtures of the acids. Treatment with hydrochloric acid was the most successful. Experiments involving alkali fusion are discussed. The two detection methods adopted were the calibration curve method and the standard addition method. The calibration method is easier to operate, but the addition method is more reasonable to protect against interference. Metal absorption is measured by the addition method was not always high. (Author abstract modified)
APTIC-25535

ZINC ACETATE CYLINDER METHOD (INTEGRAL) FOR HYDROGEN SULFIDE IN THE AIR AS AIR POLLUTANT.

(Sakusan aen entoho ni yoru taikichu ryukasuiso sokuteiho no kento). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan J. Public Health), 17 (6):321-325, June 1970. 10 refs.
Katsumi Yoshida, Yoshikazu Takatsuka, and Masayoshi Kitabatake.
Identifiers: *Colorimetry, *Hydrogen sulfide, Japan, Air quality measurements, Zinc compounds.

A cylinder method for measuring hydrogen sulfide was developed. The method entails rolling a cloth dipped in zinc acetate around a magnetic cylinder and exposing it for a month in the open atmosphere. The hydrogen sulfide in the air is transformed into zinc sulfide on the cylinder, and it is subsequently measured by means of the methylene blue method. The process is structured so that thiosulfate also simultaneously produced during the measurement period is determined by iodoazide method using the manometric method. The total amount of hydrogen sulfide is obtained by the addition of the two determined values. After exposing a known amount of zinc sulfide in the atmosphere, the recovery rate was investigated. It was 90% at 10 days, 82% at 20 days, and 63% at 30 days. An experiment conducted at Yokkaichi using the above method showed that the value of hydrogen sulfide was 3.97 to 22.40 micro-g/day/100 sq cm, and the values were on the average 3.34 times that of the traditional methylene blue method.
APTIC-25572

EXPERIMENTS ON ANISOKINETIC SAMPLING ERRORS FOR SOLID-LIQUID TWO-PHASE FLOW.

(Koeki nisoryu ni okeru hitosoku sampuringu gosa no jikken). Text in Japanese. Kagaku Kogaku (Chem. Eng.), 34 (1):69-74, 1970. 9 refs.
Koichi Iinoya, and Akihiro Yamanaka.
Identifiers: *Operating variables, *Sampling methods, *Flow rates, Japan, Particle size, Mathematical analyses, Liquids, Solids.

The deviation in measurement of apticle concentration due to anisokinetic sampling is experimentally evaluated for solid-liquid flow (water-glass beads two phases), where the necessary uniformly sized particles are easily available. The experimental results are numerically presented and an empirical equition is proposed in which the ratio of sampling to main flow concentrations depends on the ratio of sampling to main flow velocities and an experimentally obtained gradient coefficient. The results are also compared to previous experimental results and other semi-theoretical formulae for the solid-gas two-phase flow. It is evident that the anisokinetic sampling errors for solid-liquid flow are nearly half those for solid-gas flow, and that Watson's equation agrees fairly well with the results of the present experiment. On the other hand, the anisokinetic sampling errors depend on which definition of mean particle diameter is used for the inertial parameter.
APTIC-25574

HEALTH EFFECTS OF PARTICULATE AIR POLLUTION: CHARACTERIZATION OF COMPACT AND FIBROUS COMPONENTS.

In: Project Clean Air. California Univ., Berkeley, Div. of Environmental Health Sciences, California Univ. Res. Proj. S-17, 14p., Sept. 1, 1970. 5 refs.
Bernard D. Tebbens, J. LeRoy Balzer, and Douglas P. Fowler.
Identifiers: *Electrostatic precipitators, *Electron microscopy, Particulates, Smog, Operating variables, Particle size, Design criteria, Flow rates, Density, Voltage.

A 'point to plane' electrostatic precipitator of specific design was constructed to deposit particulate materials from the air directly on an electron microscope grid. An off-the-shelf DC power supply (circa 5000-10,000 KV) amperage (circa 0.1-5 microamps) was used. The ion density generated by this unit adequately charge the particles for precipitation onto the grids. Data analysis indicates a 30-75% efficiency for particles 0.3 1 micron in diameter and larger. Distribution of the particulates on the surface of stainless-steel grids, vacuum coated with silicon oxide, is excellent. Electron microscopic examination demonstrates a good distribution of particles of varying sizes and densities. The resulting grid samples are excellent for electron microscopy and electron scanning microscopy. Also of note is the deposition and retention of 'smog-like' particles when sampling on days with a 'high' air pollution index. Various other grid materials and coatings were tested and discarded. Grid damage is associated with high voltage and current resulting in small holes in the grids and grid coating. This problem has been identified and solved. Present sampling of ambient air indicates the importance of keeping the grids ultra clean during coating, storage and handling during and after sampling prior to analysis. Data regarding the chamber and electrode design, flow rates, voltages, amperages, electrode separation and other physical sampling and sampler parameters are included. The emphasis in maximizing the deposition of airborne particulates is to obtain a quantitative method of direct sampling. A flow rate of less than 5 cc per minute at a voltage of 7-8 KV with an amperage of 0.1-0.2 microamps results in a minimum of grid damage and a maximum deposition of airborne particulates. (Author abstract)

PROTECTION OF ENVIRONMENT.
For primary bibliographic entry see Field 04.
APTIC-25593

GASSING...THE BUG-A-BOO OF THE BUS BUSINESS.
Bus Transportation, 16 (10):480-482, Oct. 1937.
E. S. Pardoe.
Identifiers: *Engine exhausts, *Buses, *Odorimetry, *Odor counteraction, Gasolines, Engine operation modification, Carburetion, Spark timing, Aldehydes, Volatility.

Experience with de-gassing valves for the control of exhaust gas odors from their buses led Capital Transit to look for a measure for odors. The first step was to collect samples of exhaust gas and test them qualitatively for aldehydes. Next, the susceptibility of different fuels to form aldyhyde was investigated. The third stage of these studies had as its objective to ascertain what engine operating conditions produced maximum exhaust fuming, developing a test technique for obtaining and analyzing these gases, and determining what engine and fuel characteristics were influential in controlling this. Probably the first result of the Esso Laboratories tests was a definite proof that, in this particular bus at least, the aldehyde content was 40 times greater in the exhaust when decelerating than when accelerating or running along. For any of the types of fuel tried, the aldehyde content decreased as the volatility increased. A general improvement of 78% was effected by the rigid adjustment of carburetor and ignition systems with a high temperature manifold, and a total improvement or reduction in odor and fuming of 94% by the use of a more volatile fuel on top of the other improvements was made.
APTIC-25594

VOLATILE TOXIC COMPOUNDS.
Progr. Chem. Toxicol., vol. 3:63-98, 1967. 122 refs.
Andreas C. Maehly.
Identifiers: *Analytical methods, *Halogenated hydrocarbons, *Hydrocarbons, Sweden, Chromatography, Colorimetry, Organic acids, Chloroform, Aliphatic hydrocarbons, Aromatic hydrocarbons, Nitrates, Nitration, Volatility.

Techniques and methods, reported in the literature and personally familiar to the author, of assaying for three groups of volatile toxic compounds are detailed. The compounds include halogenated aliphatic compounds, aromatic hydrocarbons, and volatile acidic compounds. Detection of halogenated aliphatic compounds by the Fujiwara reaction is emphasized, and individual compounds investigated to date with regard to their Fujiwara reaction are tabulated, together with the relative order of color intensities for 19 of them. Also reviewed are the three steps constituting the usual analysis of halogenated volatile substances: screening, qualitative analysis and identification, and quantitative assay. Where compounds give a positive Fujiwara test, this reaction is still one of the best for quantitative analysis. Its application by the author to chloroform, trichloroethylene, and chloral hydrate determinations is reported. The discussion of aromatic hydrocarbons is limited to compounds with the lowest molecular weight, with special reference to benzene, toluene, xylenes, and nitrobenzene. The limitations of gas chromatography for quantitative analyses of aromatic hydrocarbons in blood, urine, and tissues are noted. The classical solution to analytic problems is nitration, followed by an analysis of the resulting mixture of nitro compounds. The nitrated hydrocarbons can then be subjected to paper, thin-layer, or gas chromatography. Nitration and analytical procedures favored by the author are summarized. Screening and qualitative and quantitative analyses of volatile acid compounds are discussed with particular emphasis on color tests for hydrocyanic acid and cyanides formic acid, and acetic and higher fatty acids.

EFFECT OF AUTOMOBILE EXHAUST ON CELL GROWTH IN VITRO.
Arch Environ. Health, 5 (10):319-324, Oct. 1962. 9 refs.
D. E. Rounds, A. Awa, and C. M. Pomerat.
Identifiers: *Cells, *Reproduction, *Automotive emissions, *Measurement methods, Chromosomes, Cell growth, Japan.

Automobile exhaust which was collected from a car with a simulated cruising speed of 40 mph was used to treat conjunctival elements in T30 flasks for 15 seconds, 1 minute, and 24 hours. The 24-hour treatment consisted of 15 minutes' direct exposure of the cells to the gas and incubation for the remainder of the period with the gas diffusing through the 1 mm layer of Eagle's medium which covered the cells. Cell counts indicated that the control mitotic index of 5.2% was reduced to 3.3%, 3.0%, and 1.3% for the 15-sec, 1-min, and 24-hr treated cultures, respectively. The number of cells showing clumping or stickiness increased progressively from 5% to 23% in cultures ranging from controls to 24-hr treated cells, when metaphase figures only were classified as having normally oriented scattered or clumped chromosomes or as multipolar figures. Normal and multipolar anaphase and telophase figures were variable with respect to treatment times, but the number of these stages showing chromosomal bridging was progressively increased with exhaust exposure of 1-min and 24-hrs, as compared to the control. A chloroform extract of auto exhaust containing hydrocarbons produced a marked increase in clumping of chromatin at metaphase and bridging at anaphase and telophase. In addition, the extract produced a marked stimulation in the growth rate, with the decrease in mitotic time apparently contributing to a decrease in the number of mitotic figures. Since mitotic events are interrelated with the rate of increase of the total cell population, it was concluded that an evaluation of the effect of auto exhaust on cell number can provide a simple, reproducible, and sensitive test system for estimating the relative concentrations of physiologically active components of automobile emissions. (Author summary modified)
APTIC-25604

THE APPLICATION OF AIR SAMPLING IN THE EVALUATION AND CONTROL OF THE OCCUPATIONAL ENVIRONMENT.
In: Manual of Standard Procedures. Atomic Energy Commission, New York, Health and Safety Lab., Rept. TID-4500, 15p., Sept. 1970. NTIS: NYO-4700 (3rd Ed.)
J. Breslin.
Identifiers: *Buildings, *Particulates, *Sampling methods, *Radioactive radiation, Air quality criteria, Portable, Occupational health, Particle size, Gas sampling, Particulate sampling, Samplers, Gases.

Air sampling (monitoring) of radioactivity in work environments is useful in achieving and maintaining safe working conditions, identifying sources of radioactivity, designing control equipment, verifying effectiveness of new equipment, establishing safe entry times to exclusion areas, and indicating seasonal effects or equipment deterioration. Complicating factors of time and location variations in concentrations, dust particle size, and exposure criteria are discussed. The two major types of samples are breathing zone samples of the worker's immediate environment and general air samples collected at a fixed location during a sustained sampling period. Process samples in and around process equipment are useful in contaminant source evaluation. Permanent sampling stations, number of samples, sample duration, and the organization and interpretation of sample data are considered, and a brief survey is given of available instrumentation, both direct reading and accumulating types, including portable instruments, high- and low- volume samplers, types of filter media, the lapel or personnel sampler, particle-sizing instruments, and gas monitors.

RESPIRATOR FILTER PENETRATION USING SODIUM CHLORIDE AEROSOL.
Bureau of Mines, Washington, D. C., Rept. of Investigations 7403, 10p., June 1970. 5 refs. NTIS: PB 193206
B. I. Ferber, F. J. Brenenborg, and A. Rhode.
Identifiers: *Equipment criteria, *Measurement methods, *Filters, *Safety equipment, *Sodium chloride, Laboratory facilities, Flow rates.

The use of sodium chloride aerosol to test respirator filter penetration in meeting Bureau of Mines requirements for approval of respiratory protective equipment is described. The aerosol was produced by an ultrasonic generator and treated to yield the proper conditions of relative humidity, particle size, and concentration. Using a test chamber, the aerosol was drawn through the respirator filter at several flow rates, and a sample of the filter effluent analyzed by flame photometry to determine filter efficiency. Filter tests showed that: (1) high-efficiency filters meet manufacturers' claims of more than 99.98% efficiency; (2) resin wool batt, a new filter material, shows penetration of less than 1%; (3) fume filters show very little consistency; and (4) the least efficient filters (dust and mist) showed high penetrations with both DOP and NaCl. It is concluded that with an NaCl aerosol, filter penetrations between 0.02 and 10% can be accurately detected and are readily reproducible, and changes in test concentration can be rapidly made and detected. The system provides a more sensitive and rapidly recording mechanism for particulates than is presently being used. Results are comparable with those obtained by another laboratory using different equipment. The method may also be used for routine quality control in the manufacture of filters. (Author conclusions modified)
APTIC-25611

METHODS OF FLUORINE AND FLUORIDE ANALYSIS - I.
Nucleonics, 8 (6): 24-33, June 1951. 146 refs. Part II. Ibid., 9 (1):40-49, July 1951. 153 refs. Part III. Ibid., 9 (2):51-58, Aug. 1951. 217 refs.
F. E. McKenna.
Identifiers: *Fluorine compounds, *Analytical methods, Fluorides.

A review of the literature on methods of analysis for fluorine compounds is presented, covering the period from 1816 to 1950. This first of three parts discusses the following methods: determination as lead chlorofluoride, as calcium fluoride, by reaction with aluminum, by reaction with iron (III), as lanthanum fluoride, as yttrium fluoride, as cerium (III) fluoride, and by formation of thorium fluoride. The discussion of the latter is completed in Part II.
APTIC-25615

METHODS OF FLUORINE AND FLUORIDE ANALYSIS - II.
Nucleonics, 9 (1):40-49, July 1951. 153 refs. Part I. Ibid., 8 (6):24-33, June 1951. 146 refs. Part III. Ibid., 9 (2):51-58, Aug. 1951. 217 refs.
F. E. McKenna.
Identifiers: *Fluorine compounds, *Analytical methods, Fluorides.

A review of the literature on methods of analysis for fluorine compounds is presented, covering the period from 1816 to 1950. This second of three parts discusses the following methods: determination by formation of thorium fluoride (continued from Part I), by zirconium fluoride, lakes of zirconium, and by fluosilic acid. The isolation of fluoride as the volatile fluosilicic acid is also considered at length, including alkimetric titration of fluosilicic acid.
APTIC-25616

METHODS OF FLUORINE AND FLUORIDE ANALYSIS - III.

Nucleonics, 9 (2):51-58, Aug. 1951. 217 refs. Part I. Ibid., 8 (6):24-33, June 1951. 146 refs. Part II. Ibid., 9 (1):40-49, July 1951. 153 refs.
F. E. McKenna.
Identifiers: *Fluorine compounds, *Analytical methods, Humans and animals, Foods and plants, Soils, Aerosols, Fluorides, Metal compounds, Beryllium compounds.

A review of the literature on methods of analysis for fluorine compounds is presented, covering the period from 1816 to 1950. This last of three parts discusses the pertitanic acid and fluosilicic acid methods as well as analysis of fluorocarbons, volatile fluorides, and elementary fluorine. Spectrochemical and miscellaneous analytical methods are treated briefly. References are given for determination of fluorides in specific substances such as aerosols, beryllium compounds, foods, biologicals, industrial materials, soils, and human tissues.
APTIC-25617

AESTHETIC DIESEL SMOKE LEVELS IN BOTH ACCELERATION AND LUG DOWN ARE SET TO BEGIN IN JANUARY 1970.

For primary bibliographic entry see Field 11.
APTIC-25619

ACOUSTIC SOUNDING--A NEW APPROACH TO THE STUDY OF ATMOSPHERIC STRUCTURE.

Proc. IEEE (Inst. Elec. Electron. Engrs.), 57 (4):579-587, April 1969. 14 refs.
Linday G. McAllister, John R. Pollard, and Allan R. Mahoney.
Identifiers: *Stability (atmospheric), *Acoustic sounding, Australia, Calibration methods, Experimental methods, Mathematical analyses, Lower atmosphere, Plume behavior, Atmospheric movements, Temperature (atmospheric), Scattering (atmospheric), Inversion.

Short pulses of acoustic energy at a carrier frequency of 950 Hz were beamed upwards from an array of loudspeakers. The energy which was backscattered from the random fluctuations of temperature within the turbulent regions of the lower 300 meters of the atmosphere was received on the same array and recorded on a facsimile receiver. The acoustic echoes were calibrated against temperature and wind data obtained from sensing elements fitted on a tower 75 meters high, 500 meters away from the acoustic sounder. Sounding records, together with temperature and wind data, are presented for thermal plumes, breaking waves, and the formation and breakup of a radiation inversion. The usefulness of the acoustic sounding technique in continuously monitoring the intensity of small-scale temperature inhomogeneities in the lower atmosphere is emphasized. Future developments are outlined. (Author abstract)
APTIC-25622

FLUORIDE FOILERS.

Chem. Eng. News, vol. 34:1506, 1509, March 26, 1956.
Personal Author Not Recorded.
Identifiers: *Fluorides, *Secondary standards, Costs, Animals, Plants (botany), Mineral products.

It is now standard procedure for any plant facing a potential fluoride effluent problem to main constant checks on vegetation and animals in its vicinity, not only to monitor the effluent control system but also to have a continuing factual record available if complaints are received. To permit plant chemists to check on the accuracy of their analytical techniques without running replicate analyses, a series of 35 standarized fluoride samples has been developed. They are derived from a broad range of minerals, vegetation, and animal tissue commonly found in industrial fluoride problems--soils, ores, slags, dusts, fertilizers, feeds, hays, pine needles, tree barks, etc. Samples, which cost $13 each, are available with fluoride concentrations of from 5 to 1500 ppm.
APTIC-25631

APPARATUS FOR CONTINUOUSLY MEASURING THE CONCENTRATION OF A GAS-MIXTURE COMPONENT.

(Siemens-Schuckertwerke AG, Berlin (West Germany) U. S. Pat. 3,367,747. 5p., Feb. 6, 1968. 4 refs. (Appl. March 11, 1964, 10 claims).
Joachim Sieth, and Hans-Gunter Heitmann.
Identifiers: *Measurement methods, *Sulfur dioxide, *Sulfur trioxide, Corrosion, Germany, Combustion gases, Boilers, Steam plants, Electroconductivity analyzers, Sulfuric acid, Sulfur oxides.

In combustion plants, particularly steam-boiler plants, the flue gases contain more or less considerable quantities of sulfur dioxide as well as traces of sulfur trioxide, stemming from the combustion of sulfurous fuels such as coal and oil. When the temperature of the flue gases drops below the dew point, the gases condense and may cause serious damage by corrosion in the boiler. Since the dew point is influenced substantially by the proportion of sulfur trioxide in the waste gases, it is desirable to provide means for measuring the SO3 concentration in a gas mixture. Accordingly, the concentration of SO3 and SO2 in a flow of smoke gas can be measured by performing the following steps: treating the flowing gas mixture continuously with condensing water vapor to selectively absorb SO3 from the mixture; continuously measuring the concentration of the sulfuric acid solution resulting from the reaction of the condensing water and the SO3, this concentration being indicative of the SO3 concentration in the gas mixture; continuously treating the residual flow of gas, now free of SO3, with water to absorb SO2; and measuring the concentration of the sulfurous acid solution resulting from the reaction of water and sulfur dioxide, as indicative of the SO2 concentration in the gas mixture. The concentration of the sulfuric acid solution and/or the sulfurous acid solution is advantageously determined by electric conductivity measurements.
APTIC-25637

AN AUTOMATIC HYDROGEN FLUORIDE RECORDER PROPOSED FOR INDUSTRIAL HYGIENE AND STACK MONITORING.

Anal. Chem., 32 (10):1312-1316, Sept. 1960. 12 refs. (Presented at the American Chemical Society, Division of Water Sewage, and Sanitation, 136th Meeting, Atlantic City, N. J., Sept. 1959.)
Donald F. Adams.
Identifiers: *Hydrofluoric acid, *Colorimetry, *Continuous monitoring, Occupational health, Automatic methods, Stack sampling, Recording methods.

The increasing use of fluorine and fluorides in industrial processes requires the close surveillance of the fluoride content of the air in working areas and adjacent environs. Conventional sampling and analytical techniques are time consuming and not suitable for an alarm system to warn personnel of the presence of objectionable exposure levels. A method is needed for continuously and instantaneously recording changes in the fluoride content of both indoor and outdoor air. Fluoride levels from 0.1 to 200 mg per cu m are determined by measuring the color change produced by the reaction between the green iron-ferron (8-hydroxy-7-iodo-5-qainoline-sulfonic acid) complex and fluoride ions. A method of automating this technique is suggested. (Author abstract modified)
APTIC-25647

CHEMILUMINESCENT MEASUREMENT OF ATMOSPHERIC OZONE: RESPONSE CHARACTERISTICS AND OPERATING VARIABLES.

Preprint, National Air Pollution Control Administration, Raleigh, N. C., Div. of Chemistry and Physics, 32p., 1970. 17 refs.
J. A. Hodgeson, K. J. Krost, A. E. O'Keeffe, and R. K. Stevens.
Identifiers: *Ozone, *Chemiluminescent method, Operating variables, Photometric methods, Adsorption, Flow rates, Pressure, Surface properties, Temperature.

Detection and measurement of ozone at sub-ppm levels by the chemiluminescent reaction of ozone on a dye:silica gel adsorbate were investigated. Measurement of chemiluminescent emission permits detection of less than 0.010 ppm of ozone in the atmosphere and gives a linear response for measurement up to 0.4 ppm. Response characteristics of the chemiluminescent surface are given, including sensitivity to ozone detection, surface conditioning and aging effects, and activation and decay of the chemiluminescence. Elimination of the desensitizing effect of moisture on the chemiluminescent surface by a silicone resin coating technique is discussed. Calibration curves are presented for ozone concentrations of 0 - 4 ppm. Variation of response with flow rate, pressure, and temperature is described. (Author abstract modified)
APTIC-25653

ANALYSIS OF BLAST FURNACE GAS BY GAS-SOLID CHROMATOGRAPHY.

Rev. Met. (Paris), vol. 64:681-686, July-Aug. 1967. 13 refs. Translated from French. Iron and Steel Inst., London, England, British Iron and Steel Industry Translation Service, 12p., April 1968.
G. Jecko, and B. Reynaud.
Identifiers: *Gas-solid chromatography, *Stack gases, France, Blast furnaces, Gas chromatography, Infrared spectrometry, Mass spectrometry, Hydrogen, Nitrogen, Carbon dioxide, Carbon monoxide, Flow rates, Solids, Pressure.

A method for the analysis of blast furnace top gas by gas-solid chromatography is described. The method uses absolute pressure and flow regulation, enabling reproducibilities better than 0.5% relative to be obtained in the laboratory in just 7 min for determination of hydrogen, nitrogen, carbon monoxide, and carbon dioxide. Factory tests confirmed these results and showed that the life of the columns was more than 1000 hrs. The interaction observed between the nitrogen and CO may be eliminated by using an integrator. The choice of helium as carrier gas is discussed, as are the columns employed. Comparative circuits for chromatography and for infrared and mass spectrometry are discussed, and the problems of the standard gas samples are described.
APTIC-25654

LICHENS AS AN INDICATOR OF AIR POLLUTION.

For primary bibliographic entry see Field 08.
APTIC-25655

THE DETERMINATION OF CHRYSOTILE IN AIRBORNE ASBESTOS.

Warren Spring Lab., Stevenage, England, Physical and Chemical Services Div., Rept. LR93 (PCS), 8p., Jan. 1969. 6 refs.
J. A. Gadsden, and W. L. Smith.
Identifiers: *Infrared spectrometry, *Asbestos, Great britain, Continuous monitoring, Particle size.

Methods available for the determination of asbestos are: fiber counts, using the electron microscope; magnesium determination by spectrography, and phase determination by X-ray diffraction. An experimental method for determining chrysotile using the infra-red absorption at 2.72 microns is described. Amounts of chrysotile in the range 20-700 micrograms may be determined in

this way. The method combines high sensitivity with moderate speed and simplicity; it suffers from the possibility of interference by foreign material with similar absorption bands. Its value may be greatest in situations which are to be continuously monitored, when the extent of likely interference can be established by a preliminary investigation.
APTIC-25656

IMPROVEMENTS IN OR RELATING TO DUST TRAPS FOR USE IN THE EXAMINATION OF DUST-LADEN GAS.

(Central Electricity Generating Board, London, (England)) Brit. Pat. 1,089,495. 4p., Nov. 1, 1967. (Appl. June 24, 1965, 8 claims).
Edmund James Payton, and Colin Wilson.
Identifiers: *Dusts, *Photometric methods, Great britain, Stack gases, Smokes, Baffles, Design criteria.

An optical device is described for the examination of a smoke- or dust-laden gas, which includes a first tubular portion and a second tubular portion aligned with and spaced from the first tubular portion. An elongate support member connects the two tubular portions, the tubular portions having open inner ends facing one another. A light source is in the first tubular portion and a photosensitive device is in the second tubular portion to receive light from the light source. There is one dust trap between the light source and the open inner end of the first tubular portion, while a second dust trap is between the photosensitive device and the open inner end of the first tubular portion. Each dust trap is comprised of baffles extending inwardly from the wall of the respective tubular portion and leaving an axial light path along the tubular portion.
APTIC-[illegible]464

DETECTIONS OF ALCOHOLS IN GAS ATMOSPHERES.

(Mine Safety Appliances Co., Inc., Pittsburgh, Pa.) Brit. Pat. 1,151,595. 4p., May 7, 1969. (Appl. May 26, 1966, 5 claims.)
Personal Author Not Recorded.
Identifiers: *Alcohols, *Colorimetry, United states.

A variety of alcohols are used as solvents, in the manufacture of a large number of other compounds, in toilet and other preparations, and for various other purposes. Many of these alcohols are capable of causing dermatitis; the vapors of others in air may be hazardous to humans, exhibiting various degrees of toxicity. Also, some alcohols when present in air constitute a fire or explosion hazard. The presence of alcohol in air can be readily detected by passing the air into contact with a reagent comprising a hexavalent chromium compound and a pentavalent phosphoric acid supported by an inert carrier such as hydrochloric-acid purified silica gel. From 0.0145 gr to 2.6 gr of hexavalent chromium and from 0.022 gr to 24 gr of pentavalent phosphorus are required per 100 ml of silica gel. When an alcohol is present, the reagent changes from its normal yellow color to green. The method, which can be practiced by nontechnical persons, is satisfactory for plant, field, or laboratory use.
APTIC-25666

SPECTROPHOTOMETRIC DETERMINATION OF FLUORIDE ION.

In: Manual of Standard Procedures. Atomic Energy Commission, New York, Health and Safety Lab., Rept., TID-4500, [illegible]p., Sept. 1970. 1 ref. NTIS: NYO-4700 (3rd Ed.)
Personal Author Not Recorded.
Identifiers: *Fluorides, *Spectrophotometry, Azo dye, Quenching, Ions.

In the method described, the determination of fluoride ion depends upon fluoride quenching of the thorium-chrome Azurol S lake. Fluoride ion in the range of 0.1 to 90 microgram may be determined in sodium hydroxide solutions used in air sampling, and in air filters, water, or urine samples. A spectrophotometer and distillation apperatus, as diagrammed, are required. Data are given on special reagents, sample preparation, and determination procedure. Ions such as sulfate, phosphate, uranium (VI), iron (III), aluminym, and beryllium interfere but can be removed by the distillation procedure. Only chloride interferes before and after distillation of fluorine.
APTIC-25668

STUDY OF LONG-TERM ATMOSPHERIC TRACE CONTAMINANT MONITORING AND CONTROL. (FINAL REPORT).

Little, Arthur D., Inc., Cambridge, Mass., NAS 9-10434, C-72206, 85p., May 24, 1970. 73 refs. NTIS: N70-34327
Philip L. Levins, and James E. Oberholtzer.
Identifiers: *Analytical methods, *Spacecraft atmospheres, *Spectrometry, Polarographic methods, Potentiometric methods, Gas chromatography, Trace analysis, Continuous monitoring, Intermittent monitoring, Infrared spectrometry, Mass spectrometry, Ultraviolet spectrometry, Hydrochloric acid, Hydrofluoric acid, Chlorinated hydrocarbons, Fluorinated hydrocarbons, Methanes, Carbon monoxide, Sulfur dioxide.

To meet the needs of future extended space missions, a system for controlling trace contaminants in the spacecraft atmosphere is necessary. The results of a program designed to study devices and/or techniques that can perform this function are presented. At the present state of knowledge of spacecraft contaminants, their long-term toxicity, and the environmental control subsystems, a complete analysis of the spacecraft atmosphere is required to provide an adequate measure of atmospheric quality. Ideally, a trace contaminant monitor (TCM) would provide continuous, instantaneous information on all contaminants in the spacecraft atmosphere. Rapid response is necessary to provide sufficient warning if dangerous contamination occurs, and a complete absolute analysis is required because of the great number of known and unknown trace contaminants present in the spacecraft atmosphere. Unfortunately, at the present stage of development of analytical techniques it is impossible to obtain the ability for both rapid response and a complete analysis of all contaminants in a single instrument. Therefore, it is recommended that two independent subsystems be developed for analysis - an intermittent contaminant monitor (ICM) and a continuous contaminant monitor (CCM). Each would complement the other. The ICM should be capable of measuring the level of each trace contaminant and identifying and measuring unexpected, unknown contaminants which might appear. A CCM is required because of the present limitations with respect to response time and number of locations that can be sampled. It should perform its measurement at or near the suspected source of the given contaminant. The CCM should provide fast-response measurements for a few preselected contaminants associated with specific hazards or malfunctions. Within the present state of the art, the only device which appears capable of serving as an ICM is a gas chromatograph-mass spectrometer (GCMS). It is recommended that the GCMS developed by the Jet Propulsion Laboratory for the Viking mission be adapted to, and optimized for, this application. With regard to the CCM, infrared correlation spectrometry is the most promising method now available. It has a rapid response time and can be used for remote detection. It appears to have the best potential for measuring the kinds of chemical species that indicate the quality of the spacecraft atmosphere. (Author conclusions modified)
APTIC-25686

FIELD METHOD FOR THE DETERMINATION OF INORGANIC LEAD FUMES IN AIR.

Am. Ind. Hyg. Assoc. J., vol. 20:134-137, April 1959. 7 refs. (Presented at the American Industrial Hygiene Association, Annual Meeting, Chicago, Ill., 1959.)
Enrique A. Quino.
Identifiers: *Spot tests, *Lead compounds, Fumes, Filters, Quinones.

Lead fumes in concentrations above 0.2 mg Pb per cubic meter of air may constitute a health hazard if inhaled daily for an eight hour period. Air samples were taken for ten minutes, at the rate of 4-5 liters per minute, through Whatman No. 42 filter paper placed in a filter holder and connected to the Uni-Jet sampling apparatus. After sampling, the filter is removed and two drops of a tetrahydroxyquinone solution are added to the center of the filter. After approximately 20 seconds, two drops of buffer are added, and the stain obtained is compared with the color standards. When concentrations of cadmium are double the lead concentrations, a slight interference is observed. Instead of using ethanol containing tetrahydroxyquinone in suspension, an acetone-water solution of tetrahydroxyquinone was used.
APTIC-25691

EVALUATION OF METHODS FOR THE DETERMINATION OF HALOGENATED HYDROCARBONS IN AIR.

Am. Ind. Hyg. Assoc. J., vol. 20:138-141, April 1959. 5 refs. (Presented at the American Industrial Hygiene Association, Annual Meeting, Atlantic City, N. J., April 25, 1958.)
E. E. Campbell, M. F. Milligan, and H. M. Miller.
Identifiers: *Colorimetry, *Chlorinated hydrocarbons, Gas sampling.

A comparative evaluation was made of methods of air sampling and analysis for chlorinated hydrocarbons in general, and for trichloroethylene in particular. Air samples taken with toluene bubblers were analyzed with reliable results by the controlled Fujiwara method of Seto and Schultze, by dehalogenation with sodium biphenyl and subsequent determination of the chloride ion by the mercuric thiocyanate method of Bergmann and Sanik, and by a titrimetric method using silver nitrate. Samples to be held for analysis, or by necessity shipped to the laboratory for analysis, may be taken successfully on silica gel and eluted form the silica gel using toluene. (Author conclusions modified)
APTIC-25692

STUDIES ON THE ANALYSIS OF HYDROCARBONS FROM INCINERATOR EFFLUENTS WITH A COMBUSTIBLE GAS INDICATOR.

Am. Ind. Hyg. Assoc. J., vol. 22:286-291, Aug. 1961. 4 refs. (Presented at the American Industrial Hygiene Association, 22nd Annual Meeting, Detroit, Mich., April 1961.)
Milton Feldstein.
Identifiers: *Combustion gases, *Incineration, *Potentiometric methods, Design criteria, Hydrocarbons, Carbon monoxide.

A combustible gas indicator with a 10 to 1 sensitivity scale was studied in relation to the measurement of C2 and higher hydrocarbons from incinerator effluents. Samples were collected in evacuated stainless steel 34-liter tanks over a 15-minute period. The instrument was modified in that the drying agent was replaced with ascarite, and a small diaphragm pump was substituted for the rubber aspirator bulb. Response to carbon monoxide and hydrocarbons was differentiated by means of a tube of activated carbon which adsorbed hydrocarbons, but did not adsorb carbon monoxide or methane. The instrument can be used to differentiate between incinerators emitting less than 50 ppm total hydrocarbons, and those emitting higher concentrations of hydrocarbons. Precautions to be observed in the use of the instrument for the measurement of C2 and higher hydrocarbons are discussed. (Author summary)

APTIC-25696

DEVICE FOR SAMPLING AEROSOLS.

(Commissariat a l'Energie Atomique, Paris (France)) U. S. Pat. 3,528,279. 4p., Sept. 15, 1970. 3 refs. (Appl. Jan. 22, 1968, 6 claims).
Claude Lasseur, Claude Tonnelier, and Jean Claude Zerbib.
Identifiers: *Aerosols, *Samplers, *Radioactive radiation, France, Design criteria.

A new sampler for radioactive aerosols contained in a fluid is designed to ensure homogeneity of the aerosol deposit on the filter and to prevent any part of the aerosol from being deposited within the sampling chamber before reaching the filter. These disadvantages have characterized previous sampling devices for radioactive aerosols and contributed to inaccuracies in radiation measurements. In the device described, the discharge chamber is disposed inside the sampling chamber and defines with the latter an annular space through which the fluid is circulated upstream of the filter and in which are disposed radial fins for the distribution of the fluid. Each fluid stream is oriented toward the center of and parallel to the filter. In consequence, each portion of the filter is traversed by a part of the fluid and retains the aerosols contained therein. The deposit obtained is thus uniformly distributed over the entire surface of the filter.
APTIC-25699

CHEMILUMINESCENT METHOD OF DETECTING OZONE.

(AeroChem Research Labs., Inc., Princeton, N. J.) U. S. Pat. 3,528,779. 3p., Sept. 15, 1970. 3 refs. (Appl. June 27, 1968, 4 claims).
Arthur Fontijn.
Identifiers: *Ozone, *Fluorescence, Measurement methods, Continuous monitoring, Photometric methods, Design criteria, Nitric oxide (no), Flow rates, Photoelectric phenomena, Pressure.

A method for detecting and measuring the concentration of ozone in a mixture of gases is described. It comprises the steps of passing the mixture at a given flow rate through a reaction chamber maintained at a pressure of between 0.1 and 1.0 torr, mixing in nitric oxide at a predetermined flow rate, and photoelectrically monitoring the intensity of light given off as a result of the reaction between the ozone and nitric oxide.
APTIC-25710

ATMOSPHERE SAMPLING DEVICE.

(Center for the Environment and Man, Inc., Hartford, Conn.) U. S. Pat. 3,540,261. 5p., Nov. 17, 1970. 6 refs. (Appl. May 10, 1968, 10 claims).
Max F. Scoggins.
Identifiers: *Automatic methods, *Intermittent monitoring, *Samplers, Computer programs, Design criteria.

Recently a great deal of effort has been expended in the field of air pollution and many attempts have been made to develop new techniques which will permit accurate, statistical measurement of the quality and quality of various types of solid and gaseous pollutants to be found in the atmosphere, particularly in municipal areas where the degree of pollution can rise to deleterious levels. In this connection it is frequently necessary to be able to repeat sampling procedures at predetermined time intervals and locations for the purpose of monitoring the atmosphre pollutants as well as the changing characteristics therof. This is particularly true where it is desirable to fix the time of arrival or departure of a specific concentration of material in the atmosphere. A sequential air sampling device which can be automatically controlled for preset programmed operation to provide an efficient and rapid monitoring of the ambient atmosphere in accordance with a predetermined time resolution is described which will automatically expose in succession each of a series of individual samplers for a definite and controlled period of uniform or variable length, and provide not only the rapid, automatic and successive exposure of other samples but also the enclosed storage of those samplers which have been or are about to be exposed. A single monitoring station communicates with the interior of a shallow, drumlike housing for a plurality of uniformly spaced, individually removable samplers that are provided with programmed advancement. The samplers are indexed into registry with the monitoring station and are sequentially connected with a source of vacuum for drawing the ambient atmosphere toward and through the sampler. The device is provided with a single, time controlled drive system which both makes and breaks the vacuum seal with the sampler and advances the succeeding samplers into and out of an exposed atmosphere monitoring station. (Author abstract)
APTIC-25712

SEPARATION MECHANISM OF ROUND NOZZLE CASCADE IMPACTOR: EFFECT OF CLEARANCE RATIO.

(Enkei nozuru kasukedo inpakuta no bunri kiko. Kankakuhi no eikyo). Text in Japanese. Kagaku Kogaku (Chem. Eng.), 34 (4):427-432, 1970. 7 refs. (Proceedings of the Society of Chemical Engineers, 34th Annual Meeting, Tokyo, Japan, April 1969.)
Shinichi Yuu, and Koichi Iinoya.
Identifiers: *Cascade samplers, Japan, Particulate classifiers, Mathematical analyses, Flow rates.

The separation mechanism of a circular nozzle impactor was investigated by examining experimentally and theoretically the effect of clearance ratio on target efficiency by using the fluid velocity distribution equation which Strand had obtained from the potential flow. The calculated target efficiency value was compared to the results of the experiment, and they generally corresponded, thus indicating that the proposed model explains the separation mechanism to a certain extent under the ordinary condition of operation of the impactor. The smaller the clearance ratio, the larger the slope of the separation efficiency curve, and the sharp particle classification can be achieved.
APTIC-25719

RESPONSE CALCULATIONS FOR SIDEWAYS LIGHT SCATTERING AEROSOL PARTICLE COUNTERS.

(Sokuhoko sanran ryushi kaunta no otokeisan). Text in Japanese. Kagaku Kogaku (Chem. Eng.), 34 (5):521-527, 1970. 11 refs. (Proceedings of the Society of Chemical Engineers, Second Autumn Meeting, Nagoya, Japan, Oct. 1968.)
Akira Kanagawa.
Identifiers: *Particle counters, *Light scattering, Japan, Aerosols, Particle size, Mathematical analyses, Refractive index.

The theoretical relationship between the magnitude of the response pulse of a sideways light scattering aerosol particle counter and the particle size of the aerosol as well as the refractive index was investigated for various geometric conditions of lens systems. The effects of such geometric conditions on the counter sensitivity, proportionality, as well as refractive index-dependence were examined. The response to be expected from spherical isotropic particles of various sizes and various real refractive indexes were calculated from Mie' theory and Hodkinson's equation, taking into account the spectrum characteristics of the light source and the phototube. The most appropriate geometric condition for the sideways light scattering counter is to set the angle of intersection of the optical axes at around 60 deg and the lens opening half-angle is to be made as large as technically possible at 20-26 deg for both the incident angle and the condenser lens.
APTIC-25721

LET'S GANG UP ON POLLUTION.

E.D.N. (Electrical Design News), 16 (1):45-50, Jan. 1, 1971.
Charles House.
Identifiers: *Social attitudes, Control agencies, Engineers, Respiratory functions, Health impairment, Cements, Automotive emissions, Kilns, Measurement methods, Particle size, Data-handling systems, Diffusion models.

Technological effort can improve problems that exist because of previous technology, but there are ultimate laws of nature that technology cannot buck; if Los Angeles air is now too toxic, the cure lies not only with technology but also with a cultural life-style change of its residents. They must invest in mass-transportation methods, or they even must walk. Examining cement kiln particle emissions, an interesting relationship is observed between particle size and filter efficiency. Although the cement plant owner may have installed a filter that will largely have eliminated dust particles between 1-10 micrometers, also verified by the local monitoring agent which measures in terms of micrograms per cubic meter, almost invisible submicron particles probably are still being emitted. Anything smaller than 1 micrometer is capable of entering the small terminal air sacs of the lung. A brief discussion is included on the pollution problems posed by auto emissions and what has been done toward relieving them. Not only is the claimed effectiveness of Detroit-installed systems questionable, but reducing hydrocarbons almost invariably increases the emission of nitrogen oxides. To be effective in pollution abatement, an agency must know the relationship between emission and concentration level, as well as the relationship between such levels and health. Engineers and scientists can help considerably in obtaining and interpreting data, particularly in the following areas: design and correlation of a diffusion model for an area, taking into account the meteorology and terrain of the entire surrounding area; design of a community 'lung' model, that would take into consideration the population distribution and health, pollutant concentrations, particle size distribution, relative toxicity of various pollutants, and the effect of these upon the health of the lung; design and implementation of an instrumentation system for monitoring both the emissions and the levels of pollution; the implementation of data communications; and correlation of the monitor data with the lung model and diffusion model.
APTIC-25729

SAMPLE HANDLING SYSTEM FOR AUTO EXHAUST ANALYZER.

(Beckman Instruments, Inc., Fullerton, Calif.) U. S. Pat. 3,537,296. 3p., Nov. 3, 1970. 2 refs. (Appl. Nov. 8, 1967, 2 claims).
Larry D. Gamache.
Identifiers: *Engine exhausts, *Flame ionization detector, *Pressure, Automobiles, Design criteria, Flow rates, Temperature.

Pressure boosting causes auto exhaust to flow through a hydrogen flame detector at temperatures above 150 C without overheating the pump, by introducing a sample pump subsequent to the detector. A bypass around the detector increases the flow rate and response, and a vacuum barrier surrounding the detector shields it from atmospheric contamination. An auxiliary air supply is connected to a point between the detector and the pump to keep the flow through the pump at the desired temperature and pressure. The invention thus overcomes the low positive pressure of auto exhaust and the problems encountered with standard pumps caused by the high temperature requirements.
APTIC-25732

GAS TESTING PROCESS FOR SMOG FORMING CONSTITUTENTS.

(Assignee not given.) U. S. Pat. 3,537,823. 10p., Nov 3, 1970. 8 refs. (Appl. June 3, 1968, 10 claims).
William B. Innes.
Identifiers: *Engine exhausts, Catalytic oxidation, *Temperature sensing instruments,

*Hydrocarbons, Smog, Internal combustion engines, Analytical methods, Potentiometric methods, Chromatography, Chromium compounds, Vanadium compounds, Oxides, Catalysis, Temperature.

A process and testing device are described for measuring the smog-forming organic ingredients of a gas, specifically the exhaust from an internal combustion engine. The gas sample is passed through a reactive bed of supported and non-supported vanadia or chromia, at 200-500 C, to induce exothermic oxidation of selected hydrocarbons. A temperature probe in the catalyst bed (a chromatography column through which the sample gas first passes) senses the temperature rise due to oxidation. The quantity of smog-forming hydrocarbon constituents can be determined directly from the temperature increase since under proper conditions the chromia- and vanadia-induced oxidation produces a temperature rise linear with the amount of these hydrocarbons and insensitive to other combustibles. The process also provides data useful for engine maintenance, for improving ignition characteristics, and for indicating faulty valve operation. It can easily be modified to correlate well with the hexane-sensitized non-dispersive infrared method currently used for control purposes. Interference from non-hydrocarbon constituents is negligible.
APTIC-25734

MICRO-PARR ASSEMBLY SUITABLE FOR MICRODETERMINATION OF FLUORINE IN ORGANIC COMPOUNDS.

Anal. Chem., 30 (9):1579-1580, Sept. 1958. 12 refs.
Al Steyermark, and Frank P. Biava.
Identifiers: *Microbombs, *Fluorinated hydrocarbons, Analytical methods, Measurement methods, Temperature.

A clamping device for holding together the parts of a micro-Parr bomb is described that will not break down at temperatures as high as 700 C. The device thus permits the bomb to be used for microdeterminations of fluorine in organic compounds through fusion with metallic potassium or sodium at elevated temperatures. Details of the nut-and-bolt clamping device are schematically illustrated. The bomb and clamping assembly have been used for hundreds of fusions without leakage.
APTIC-25752

AEROSOL PREPARATION, GENERATION, AND ASSESSMENT. PROJECT HARE.

Public Health Service, Las Vegas, Nev.,
Southwestern Radiological Health Lab.,
Memorandum of Understanding SF 54 373, 22p.,
Feb. 1970. 9 refs. NTIS: SWRHL-75-R
R. H. James, D. N. McNelis, E. L. Whittaker, and N. C. Kennedy.
Identifiers: *Aerosols, *Radiation measuring systems, *Radioactive tracers, Dust fall, Particle size, Cascade samplers, Aerosol generators, Meteorological instruments, Plume behavior, Clouds.

Project HARE was the sixth in a series of experiments in which a radioactive contaminant was released under controlled conditions to simulate the passage of a nuclear event-related radioactive cloud. The history of the radio-nuclide from the nuclear event to a constituent of man's diet is studied as a function of the interrelated physical, chemical and biological variables. The measurement of some of the physical and chemical parameters involved in the preparation, generation and assessment of the aerosol is reported. A dry aerosol consisting of submicrometer diatomaceous earth particles tagged with 54.1 micro-Ci of Iodine 131 was released over two types of growing forage (alfalfa and Sudan) at the U. S. Public Health Service Experimental Farm at the Nevada Test Site. The study area was instrumented with fallout planchets, glass slides, air samplers, cascade impactors, and meteorological equipment. The aerosol was air-carried over the study areas and deposited with an average activity concentration of 1.25 micro-Ci/sq m on the Sudan and 1.43 micro-Ci-sec/cu m on the alfalfa. The count median diameter of the aerosol was 0.6 micron which varied only slightly from one location to another. Average integrated air concentration and average deposition velocity were 87.5 micro-Ci-sec/cu m and 1.59 cm/sec, respectively. (Author abstract modified)
APTIC-25760

METEOROLOGICAL INSTRUMENTATION FOR AIR POLLUTION APPLICATIONS.

For primary bibliographic entry see Field 05.
APTIC-25764

ON THE SEPARATION OF AIRBORNE MATTER BY INERTIA EFFECT IN THE SUBMICRONIC RANGE.

Staub (English translation from German of: Staub, Reinhaltung Luft), 30 (5):15-22, May 1970. 4 refs.
Heinz Buchholz.
Identifiers: *Particle size, *Cascade samplers, *Inertial separation, Germany, Aerosols, Operating variables, Sodium chloride.

When a low pressure cascade impactor was subjected to tests using sodium chloride aerosols, it was suitable for particle size analysis in the submicron range. Theoretical concepts concerning particle separation are discussed, with particle loss diminishing with decreasing particle diameter. The size distribution of two differently generated NaCl aerosols was determined with the aid of electron microphotographs of the particles, separated in an electrostatic precipitator. Attention was drawn initially to the observation that the separation efficiency depends on the kinetic energy of the particles and the force of adhesion. Dry and oil-treated plates were loaded to different degrees with particles and the variation in the separation efficiency relative to load was measured. Critical velocity varied with the surface condition, decreasing with the growing particle layer. For dry plates the particle loss is greater and, correspondingly, the critical velocity lower than for oil-treated plates. However, with dry plates the critical velocity may temporarily increase due to a building-up particle layer. Since with rising stage numbers the particle velocity increases at a slower rate than the critical velocity, the bouncing-off effect is of little importance in the separation of submicronic particles. (Author conclusions modified)
APTIC-25771

TIME CONSTANT OF A THOMAS AUTOMETER AND SIGNIFICANCE OF INDICATED RESPONSE.

Anal. Chem., 36 (12):2296-2301, Nov. 1964. 4 refs.
H. P. Sanderson, P. E. Penner, and Morris Katz.
Identifiers: *Thomas autometer, *Time constant, *Sulfur dioxide, Canada, Electroconductivity analyzers, Mathematical analyses.

The time constant of a Thomas sulfur dioxide analyzer was determined by measurements at various concentration levels. The arithmetic mean time constant was found to be 46.0 seconds with a standard deviation of 5.5 seconds. A study was made of the peak values observed when known concentrations of sulfur dioxide were injected into the sample air stream for periods of a few seconds to 200 seconds. The area under the curve of gas injection time in seconds versus peak height in parts per million was employed to calculate the actual concentrations producing a given peak on the instrument. Peak height was dependent upon injection time and concentration. The integrated value of a series of peaks corresponded to the actual average concentration. This method may be applied to determine the time constant of many types of sensing instruments. (Author abstract)
APTIC-25777

A FILTER PAPER METHOD FOR LEAD FUME COLLECTION.

J. Ind. Hyg. Toxicol., 25 (5):185-188, May 1943. 11 refs.
Leslie Silverman, and John F. Ege Jr.
Identifiers: *Fumes, *Filters, *Lead compounds, Sampling methods, Magnesium compounds, Zinc compounds, Iron oxides, Flow rates.

A study on the efficiency of high retention analytical filter papers for collecting airborne lead fumes showed that the efficiency was high (87%) and constant at high flow rates. Lead fume concentrations were produced in a large dust cabinet by burning a lead tetraethyl solution in alcohol, and they were kept in suspension by means of a circulating blower and an anemostat. A sampling device was made from two inexpensive tin-plated funnels and galvanized sheet iron. The results obtained with two filter papers in series for various papers, filtering velocities, and lead fume concentrations are presented tabularly; the absolute efficiencies for several concentrations, kinds of papers, and filtering velocities are also presented. The method is applicable to zinc, magnesium, and iron fume particles. (Author summary modified)
APTIC-25793

PREPARATION OF RADIOACTIVELY LABELLED CONDENSATION AEROSOLS. I. AEROSOLS OF SODIUM CHLORIDE, SILVER IODIDE AND SULPHURIC ACID.

For primary bibliographic entry see Field 06.
APTIC-25801

CURRENT INFORMATION ON THE QUANTITIES OF FLUORIDE FOUND IN AIR, FOOD, AND WATER.

A.M.A. Arch. Ind. Health, 21 (4):312-315, April 1960.
J. Cholak.
Identifiers: *Chemical methods, *Sampling methods, *Fluorides, Foods, Water, Temperature.

The significance of the result of a determination of fluoride in the investigation of the behavior of the fluoride ion in biological material depends partly upon the techniques and precautions employed in collecting the sample and partly upon the precision of the analytical procedure that is employed. The general analytical technique involves three procedures: the conversion of the fluoride into soluble, inorganic form by means of an ashing step usually carried out at 600 C; the separation of fluoride as hydrofluosilicic acid from interfering ions by the Willard and Winter distillation procedure, and the estimation of the quantity of fluoride in the distillate. This estimation may be done by determining the bleaching effect of the fluoride ion on colored metal dye complexes by a titration procedures. Further details of fluoride determinations are described, and concentrations are presented tabularly for fluorides in air, food, and water.
APTIC-25806

FURTHER APPLICATIONS OF THE LIMED FILTER PAPER TECHNIQUE IN FLUORINE AIR POLLUTION STUDIES.

J. Air Pollution Control Assoc., 7 (2):88-91, Aug. 1957. 11 refs.
Donald F. Adams.
Identifiers: *Limestone, *Analytical methods, *Filters, *Fluorides, Annual, Monthly, Seasonal, Plants (botany), Spectrophotometry, Measurement methods, Ground level.

The exposure of lime-treated filter papers under protection of wooden shelters has been suggested as an inexpensive technique for detecting atmospheric fluorides and delineating areas of fluoride pollution. In the present investigation, data were obtained on comparative fluoride levels in different shelters, on the relationship between average monthly lime paper fluoride levels and fluoride accumulated in herbage during the grow-

ing season, and on the reliability of the lime paper technique in measuring the relative intensity of fluoride pollution from one year to another. Under similar conditions of exposure, only small differences in fluorine content of treated papers may exist between duplicate shelters; the correlation between the fluoride in the lime papers and the ground cover vegetation for a wide range of fluoride exposure levels is high enough to predict with reasonable accuracy even the fluoride content of heterogeneous herbage throughout the growing season. The reliability of the lime papers in measuring relative fluoride pollution from one year to the next was substantiated when observed diminutions in fluoride pollution reflected by comparative lime paper fluoride levels were found to be due to a reduction of fluoride emissions rather than variations in wind patterns.
APTIC-25816

THE ATMOSPHERE TESTING DILEMMA.

Mater. Res. Std., 10 (1):11-12, Jan. 1970. 6 refs.
B. Levadie.
Identifiers: *Costs, *Standards, *Sampling methods.

Analyzing the atmosphere for small quantities of pollutants that may have a large effect is a difficult, costly process. So much so that the interlaboratory collaborative techniques usually employed as the basis for ASTM standards are prohibitively expensive in this case. For this reason ASTM Committee D-22 is proposing that the normal interlaboratory data acquisition process be financially supported through private efforts of the Society's corporate and organization membership. This fund raising effort is now in progress. For gathering air samples, the Committee is recommending the use of spikes and permeation tubes. (Author abstract modified)
APTIC-25821

IMPROVEMENT OF X-RAY SPECTROGRAPHIC ANALYSIS OF FILTRATION OF THE L LINES FROM THE PRIMARY BEAM.

Can. Spectr., 13 (1):19-24, Jan. 1968. 4 refs.
(Presented at the 13th Colloquium
Spectroscopicum Internationale, Ottawa, June 19-23, 1967.)
J. Leroux, and M. Mahmud.
Identifiers: *L radiations, *Analytical methods, *Spectrometry, *X-rays, *Metal compounds, Nickel, Canada, Filters.

Interference of L radiations that are coherently as well as incoherently scattered by tungsten primary beams can complicate qualitative analysis or impair the accuracy of quantitative determinations. The problem is minimized by placing nickel-foil filters directly over tube windows. These filters can be mechanically adapted to most types of spectrographic X-ray tubes. The technique is valuable for qualitative analysis of heterogeneous samples associated with low atomic number compounds, quantitative analysis of a tungsten sample, quantitative analysis of samples containing elements present as impurities in the X-ray target, and qualitative analysis of thin films of complex mixtures supported by a cellulose membrane.
APTIC-25822

DETERMINATION OF 2-NITROPROPANE AND OF NITRITE IN MIXTURES.

Anal. Chem., 33 (3):473-475, March 1961. 7 refs.
Frances L. Estes, and Pauline K. Baughman.
Identifiers: *2-nitropropane, *Colorimetry, *Nitrites, Solvents, Organic nitrogen compounds, Hydrolysis.

Aqueous solutions containing nitrite and 2-nitropropane were extracted with 1 to 5 ml of heptane or benzene. Nitrite ion was determined on an appropriate aliquot of the aqueous layer by the sulfanilamide method; for determination of 2-nitropropane, a hydrolysis method was applied to the organic extract. Because of cross interference in analysis for nitrite and 2-nitropropane, preliminary separation of the components in an appropriate solvent is required.
APTIC-25824

ON THE SIMULTANEOUS MEASUREMENTS OF THE PARTICLE SIZE DISTRIBUTION OF RADIOACTIVE CHARGED AEROSOLS AND CONCENTRATION RATIO OF POSITIVE TO NEGATIVE.

J. Radiat. Res., 10 (2):52-61, June 1969. 9 refs.
Toshio Sekikawa, and Sadamu Mochizuki.
Identifiers: *Aerosols, *Particle size, *Spectrometry, *Radioactive tracers, Japan, Microscopy, Radon, Ions, Alpha particles.

An improved method of measuring the mobility spectra of radioactive charged aerosols that makes it possible to detect RaA in the Radon daughter aerosols is described. The method uses a parallel plate type of spectrometer provided with nuclear plates which are placed in a row in the middle areas of the collecting plates prior to sampling. By this technique, alpha ray tracks of radioactive substances collected on the surface of the nuclear plates during and after sampling can be recorded. In stored radioactive aerosols in a vessel containing Rn decay products, the star type alpha tracks of RaA were often found clearly on the developed nuclear plate with the mobility ranging from 3 sq cm/ (v) (sec) to 0.3 sq cm/ (v) (sec). Using Rn and Rn daughters as tracers, it is possible to find directly the attachment of radioactive ion to aerosol and the coagulation of radioactive aerosols from the alpha tracks in the developed nuclear plates by using a microscope. (Author abstract modified)
APTIC-25834

THE USE OF RADIOACTIVE TRACERS IN QUANTITATIVE STUDIES OF MOVEMENTS OF THE ATMOSPHERE.

For primary bibliographic entry see Field 05.
APTIC-25842

CENTRIFUGE SEDIMENTATION SIZE ANALYSIS OF SAMPLES OF AIRBORNE DUSTS COLLECTED IN MEMBRANE FILTERS.

American Society for Testing and Materials,
Philadelphia, Pa., Proc. Am. Soc. Testing Mater.,
61st Annu. Meet., Particle Size Meas., Boston,
Mass., 1958, p. 117-126. 6 refs. (June 26-27, Pub. 234.)
K. T. Whitby, A. B. Algren, and J. C. Annis.
Identifiers: *Dusts, *Particle size, *Sedimentation, *Centrifugal separators, Suspended particulates, Membrane filters, Design criteria, Microscopy.

The application of a rapid general purpose centrifuge sedimentation method developed at the University of Minnesota to the size analysis of fine powders is described. Through the development of special fine-bore capillary centrifuge tubes, this method is extended to the size analysis of fractional milligram quantities of airborne dusts collected on 47-mm membrane filters. Evaluation of this method against light and electron microscope data and its extensive use in an airborne dust survey shows that it is a practical and convenient tool for the size analysis of airborne dusts. Application of this method to the size analysis of airborne dusts and of very fine, dilute suspensions of particles in a liquid is also described. (Author abstract modified)
APTIC-25843

LOW-VELOCITY GAS-LIQUID IMPINGER FOR THE CONTINUOUS ESTIMATION OF SULPHUR DIOXIDE AND OTHER ATMOSPHERIC POLLUTANTS.

J. Sci. Instr., vol. 38:480-483, Dec. 1961. 3 refs.
T. Nash.
Identifiers: *Electroconductivity analyzers, *Sulfur dioxide, Great britain, Colorimetry, Photometric methods, Impingers, Scrubbers, Calibration methods, Design criteria, Instrumentation, Sulfuric acid, Hydrogen, Carbon dioxide, Peroxides.

An impinger is described, based on the observation that a low-velocity jet of air containing sulfur dioxide can transfer it very efficiently to the surface of dilute hydrogen peroxide, then by rapid micro-circulation to the underlying solution. Air is drawn into the cell compartment through a filter and glass jet, blowing vertically down onto 0.1 volume peroxide in the cell in which SO2 is scrubbed from the air and converted to sulfuric acid. The electrical conductivity of the solution in the cell is measured through electrodes connected to a simple oscillator, amplifier, and recorder. The vapor reaction, electrical circuit, stock solution, jet characteristics, and time constant are discussed. Calibration and performance are also described. The instrument records SO2 in the range 0.01 to 10 ppm where rapid changes in concentration can be expected but the accuracy required is not more than 1 in 20. Its advantage is that gas absorption and measurement of conductivity are done in the same small cell, with the consequent gain in simplicity and speed of response. By using 0.1 mM alkali in the reservoir, and no peroxide, it is possible to record carbon dioxide concentration in the range normally encountered in air. One modification of the instrument measures light absorption instead of conductivity, permitting the use of colorimetric reagents.
APTIC-25851

MEASUREMENT OF THE SULFUR TRIOXIDE CONTENT OF THE AIR.

Med. Lavoro (Milan), 53 (5):325-329, 1962. 1 ref.
Nicola Zurlo.
Identifiers: *Colorimetry, *Sulfur trioxide, Italy, Acetone, Sulfates.

An accurate, sensitive, very simple titration method for the determination of atmospheric sulfur trioxide is described. The sulfate ion (SO4), in the presence of acetone, decolorizes the lake thorium-eriochrome cyanine R. A very sensitive colorimetric method is based on this reaction; it is however easily influenced by small variations in pH and by the interference of other substances. The titration method eliminates the above disadvantages. The titration is carried out using a diluite thorium nitrate solution. Under set conditions (pH 3.5 in the presence of acetone) the SO4 ion reacts quantitatively with thorium; lake is formed and the end point thus obtained, when all SO4 ions and any other interfering substances have combined with thorium. Together with the sample titration, a blank is performed in the presence of barium chloride which, by combining with the SO4 ion, prevents its reaction with thorium; in this way only interfering substances are titrated. The difference between the two titrations is specific for sulfuric acid. The titration error is less than plus or minus 0.5 microgram SO3. Interfering metals may be eliminated by the addition of ethylendiamintetracetic acid (EDTA) slightly in excess of the stoichiometric volume. The interfering action of iron may be eliminated by the addition of potassium cyanide. (Author summary modified)
APTIC-25854

DETERMINATION OF ARSENIC IN THE ATMOSPHERE.

(Bestimmung des Arsens in der atmosphaerischen Luft). Text in German. Z. Ges. Hyg. (Berlin), 16 (10):798-803, Oct. 1970. 29 refs.
E. Auermann, and E. Wabra.
Identifiers: *Colorimetry, *Arsenic compounds, Germany, Industrial areas, Combustion products, Aerosols, Dusts, Metal fabricating and finishing, Air quality measurements, Aspirators, Field tests, Arsine.

A new method for the determination of arsenic trihydride, of aerosol arsenic, and of arsenic in sedimentation dusts yielding better reproducible analytical results than both the molybdenum-blue

and the silver diethyldithiocarbamate method is proposed. A known volume of air contaminated with arsenic is drawn by suction into an absorption vessel containing sodium hydroxide in solution. From the absorption vessel, arsenic is absorbed in the form of arsenic trihydride in a 0.5% solution of silver diethyldithiocarbamate and pyridine. The resulting red complex compound is determined colorimetrically. Dust containing arsenic must be treated with acids before being analyzed by the procedure described. In the Freiberg sector of ore processing foundries, arsenic contents of 1.3-125.6 mg sq m/ 30 d were detected in sedimentation dust samples. In Karl-Marx-Stadt where no specific arsenic emission is known, 0.0002 mg As/ cu m air was detected by the above method.
APTIC-25861

A NEW SEDIMENTATION METHOD FOR DUST SPECIMENS.

(Ein neues Sedimentationsverfahren fuer Staubproben). Text in German. Staub, Reinhaltung Luft, 30 (11):465-468, Nov. 1970.
Jorgen Jahr.
Identifiers: *Dusts, *Sedimentation, Europe, Particle size, Temperature.

A new simple sedimentation method for mg amounts of fine dust is described. Experiments designed for analysis of variance showed that the precision was satisfactory for industrial hygiene purposes; the recovery of the fraction less than 5 micron decreased significantly when the concentration of dust was increased from 0.013 to 0.13 vol%; secondary sedimentation of the fraction greater than 5 micron increased the recovery significantly, but is not necessary for routine use; there was no significant variance due to analysing in four individual apparatuses; a constant temperature is desirable, but not strictly necessary if the temperature variation is small.
APTIC-25869

A SCATTERED LIGHT MEASURING DEVICE FOR HIGH CONCENTRATIONS OF DUST.

(Ein Streulichtmessgeraet fuer hohe Staubkonzentrationen). Text in German. Staub, Reinhaltung Luft, 30 (11):479-483, Nov. 1970. 4 refs.
Klaus Borho.
Identifiers: *Particle counters, *Photometric methods, Germany, Aerosols, Dusts, Particle size, Design criteria, Light scattering.

In the case of optical particle counters, the maximum particle concentrations determined by the measured volume from which the scattered light impulses are received. High concentrations require very small volumes. It is possible to reach concentrations of up to 100000 particles/cu cm with the instrument described. The results of tests carried out on latex aerosols show the limits of application and the accuracy achieved.
APTIC-25870

A SCATTERED LIGHT PARTICLE-SIZE SPECTROMETER FOR SUBMICROSCOPIC AEROSOLS OF HIGH CONCENTRATION.

(Ein Streulicht-Teilchengroessenspektrometer fuer submikroskopische Aerosole hoher Konzentration). Text in German. Staub, Reinhaltung Luft, 30 (11): 475-479, Nov. 1970. 1 ref.
Jan Bol, Josef Gebhart, Werner Heinze, Wolf-Dieter Petersen, and Gerhard Wurzbacher.
Identifiers: *Particle size, *Lasers, *Spectrometry, Germany, Aerosols, Design criteria, Light scattering.

A scattered-light spectrometer for particle size determination has been specially developed for uniform aerosols of high concentration. Particles of a size from 0.14 micron to 1 micron can be measured at a concentration of up to 500000 particles/cu cm, and at a counting rate of up to 10000 particles. The highest permissible concentration is reached by focusing the laser beam to a cross section of 15 micron by 100 micron and by aerodynamic focusing of the aerosol stream to a diameter of 40 micron. In this case the effective measured volume is only 2 times 10 to the minus 8th power cu cm. By using a laser of higher light intensity and shorter wave length it is possible to reduce the minimum detection limit to a particle diameter of 0.09 micron.
APTIC-25871

RESULTS OBTAINED WITH A NEW METHOD OF DETERMINATION OF THE PARTICLE-SIZE DISTRIBUTION OF SUSPENDED DUST.

(Ergebnisse nit einem neuen Verfahren zur Bestimmung der Teilchengroessenverteilung von Schwebestaub). Text in German. Staub, Reinhaltung Luft, 30 (11): 458-465, Nov. 1970. 8 refs. (Presented at the Internationalen Staubtagung, Bonn-Bad Godesberg, West Germany, June 9-11, 1970.)
Wilhelm Walkenhorst.
Identifiers: *Particle size, *Sieve analysis, *Aluminum oxides, Germany, Dusts, Coal, Mining, Permeability.

Fine-pore sieves made of aluminium oxide of an average pore size of 0.025 micron are used for collecting suspended dust in coal mines. Rock dust requires a frequency maximum between 0.1 and 0.2 micron because fine particles are more numerous than in the case of coal. Above 0.5 micron the distribution function can be approximated by an exponential function with exponent - 2.4. This relationship is not valid for coal dust. Below 0.2 micron there is a steep slope in the distribution curve. The frequency maximum is about 0.2 micron. If the surfaces and volumes or masses of the respirable fine dust are calculated (5 micron equal to 50%; 7 micron equal to 0%), particles of a size up to 1 micron will amount to 2-4% of the total mass of the respirable portion. In contrast to this the surfaces amount approximately to 10-20%. The rock dust content of the respirable dust increases with decreasing particle size. Values of 80-85% are reached below 1 micron.
APTIC-25872

QUANTITATIVE ANALYZER OF SULFUR CONTENTS.

(Kokusai Denki Kabushiki Kaisha, Tokyo (Japan)) U. S. Pat. 3,529,937. 7p., Sept. 22, 1970. 7 refs. (Appl. Feb. 24, 1967, 9 claims).
Takashi Ihara, and Kiyoshi Hoshino.
Identifiers: *Colorimetry, *Sulfur compounds, Steel, Japan, Combustion gases, Gasolines, Absorption, Design criteria, Temperature.

A quantitative analyzer is described for analyzing the sulfur content of a sulfurous sample burned in a combustion chamber. Sulfur contents included in steel increase generally the fragility of the steel, and sulfur components included in gasoline reduce the life of the gasoline engine. Moreover, men and animals are in danger due to exposure to the sulfur components included in the waste gases. The products of combustion are delivered through a heated conduit to an absorption cell containing an absorbing solution in which the gaseous sulfurous products are dissolved. The conduit is heated and maintained at a suitably high temperature to prevent attachment of the gaseous sulfurous products on the surface of the conduit and to prevent absorption of the gaseous sulfurous products by moisture present in the conduit. Determination can be carried out with titration by use of the standard solution of sodium hydroxide after addition into the absorbing solution of a mixture of methyl-red and methyl-blue. Means are also provided for recirculating the absorbing solution to uniformize its concentration. (Author abstract modified)
APTIC-25911

METHOD AND APPARATUS FOR DETERMINING THE PRESENCE OF VAPOR IN A GAS.

(Technology Inc., Dayton, Ohio) U. S. Pat. 3,528,278. 7p., Sept. 15, 1970. 6 refs. (Appl. Sept. 5, 1967, 19 claims).
John Jerome Sterling.
Identifiers: *Photometric methods, *Humidity, *Refractive index, Design criteria, Condensation (atmospheric), Light radiation, Gases, Vapors.

A method is described for quickly and readily determining the dew point of the atmosphere or the presence of condensed vapor in a gas. Previous methods have been complex and/or time consuming, and some would operate satisfactorily only in complete darkness. The present apparatus comprises a body of translucent material. Radiation energy in the form of light energy is directed into the body at such an angle that reflections within the body normally occur. However, if dew forms upon a surface of the body of translucent material, some of the radiant energy which enters the body is refracted from the body and thus is not reflected. Means are provided for sensing the radiant energy which is reflected through the translucent body.
APTIC-25912

DETERMINATION OF NO2 AND NO IN AIR.

Am. Ind. Hyg. Assoc. J., vol. 21:81-96, Feb. 1960. 9 refs.
W. E. Gill.
Identifiers: *Colorimetry, *Spectrophotometry, *Nitric oxide (no), *Nitrogen dioxide (no2).

The reliability and accuracy of the phenoldisulfonic acid method for determining nitrogen oxides in air and of methods using a Griess-Ilosvay type reagent were studied. In addition, an accurate and relatively simple method was derived for the laboratory preparation of known concentrations of nitrogen dioxide in air by thermal decomposition of lead nitrate. This was done to facilitate study of the methods and to avoid the use of standard curves based on uncertain empirical relationships betwen metallic nitrite solutions and the nitrite produced by solution of nitrogen dioxide in aqueous reagents. Determinations at atmospheric nitrogen dioxide by collection in 500 ml evacuated flasks and subsequent determination as nitrite by the phenoldisulfonic acid method was accurate at concentrations above 16 ppm. When nitrogen oxide was determined by collection in syringes containing Griess-Ilosvay reagents and reading the color intensity of the sample, best results were obtained when readings were made after the period of rapid color development, i.e., one hr after collection. Results show that Griess-Ilosvay reagents are not specific for nitrogen dioxide but are significantly sensitive to the effects of nitric oxide.
APTIC-25918

SPECIFIC SPECTROPHOTOMETRIC MICRODETERMINATION OF BERYLLIUM.

Microchem. J., 12 (1):32-39, March 1967. 7 refs.
John P. McCloskey.
Identifiers: *Spectrophotometry, *Beryllium compounds, Dusts, Colorimetry.

A highly specific spectrophotometric analytical procedure for beryllium was developed for the rapid determination of microgram or nanogram amounts of the element in airborne dust samples. Ammonium aurintricarboxylate (aluminon) reagent is used for color reaction and absorbance is determined a 530 millimicron against a reagent blank. The amount of beryllium in a sample is then determined by reference to a standard curve. Tests results with standard beryllium solutions indicate conformance of the red beryllium-aluminon complex to Beer's law in the 10-40 ppm range. The sensitivity of the procedure is 0.01 microgram/sq cm based on absorbance of 0.01. Specificity of the method is enhanced by means of a complexing mixture comprising disodium ethylenediaminetetraacetate, triethanalamine, and cyanide. Of the elements tested, only fluoride interfered with determinations.

APTIC-25919

ANALYSIS OF POLYCYCLIC HYDROCARBONS IN PARTICULATE POLLUTANTS.

Am. Ind. Hyg. Assoc. J., vol. 23:487-495, 1962. 19 refs. (Presented at the American Industrial Association, 23rd Annual Meeting, Washington, D. C., May 1962.)
J. L. Monkman, G. E. Moore, and Morris Katz.
Identifiers: *Spectrophotometry, *Polynuclear compounds, *Anthracenes, *Fluoranthenes, *Fluorenes, *Perylenes, *Benzopyrene, *Benzo (3-4)pyrene, Canada, Chrysenes, Benzopyrenes, Fluorescence.

A simplified procedure for the analysis of polycyclic hydrocarbons in air samples is suggested. The sample, on glass fiber sheet, is extracted for three hours at room temperature with cyclohexane. The extract is analyzed for benzo (a)pyrene (BaP) by measuring fluorescence emission intensities at optimal excitation wavelengths. The BaP values found with this procedure agree reasonably well with results obtained by ultraviolet chromatographic techniques, despite the fact that preliminary column separation of hydrocarbons is omitted. Future experiments will show whether anthanthrene and perylene in unseparated air samples can be determined with similar accuracy. (Author abstract modified)
APTIC-25920

THE MEASUREMENT OF EMISSIONS FROM SOLID FUEL HEATING UNIT.

(Die Mabtechnische Erpassung der Emissionen aus Hausbrandofen fur feste Brennstoffe).
Gesundh. Ingr., no. 10:295-306, 1969. 17 refs.
Translated from German. Belov and Associates, Denver, Colo., 33p., Dec. 2, 1970.
Fritz Baum, Werner Brock, and Hartmut Brell.
Identifiers: *Domestic heating, *Measurement methods, Carbon black, Germany, Coal tars, Soot, Fuels, Coal, Coke, Operating variables, Gas chromatography, Flame ionization detector, Colorimetry, Smokemeters, Samplers, Electrostatic precipitators, Filters, Carbon dioxide, Carbon monoxide, Sulfur oxides, Hydrogen sulfide, Condensation.

The quantities and qualities of substances emanating from home heating units depend upon the fuel used, the type of heating unit, and the method in which it functions. Typical emissions include soot, tar, carbon oxides, sulfur oxides, and hydrogen sulfide. Measurements tend to be difficult due to the variety of emissions involved, but several methods are described and evaluated. Electrostatic precipitators, smoke density gauges, filter papers, and gravimetric tedchniques are included. A test situation is described with sampling by the filter paper method, condensation trays for the gravimetric determination of exhaust quantities, and silica gel tubes for determination of carbon emissions. Results are discussed.
APTIC-25921

SOME PROBLEMS OF ATMOSPHERIC CHEMISTRY.

In: Compendium of Meteorology. T. F. Malone (ed.), Boston, American Meterological Society, 1951, p. 1126-1136. 60 refs.
H. Cauer.
Identifiers: *Chemical methods, *Research methodologies, *Meteorology, Chemists, Germany, Colorimetry, Spectrophotometry, Altitude, Turbulence (atmospheric), Atmospheric movements, Condensation (atmospheric), Micrometeorology, Nitric acid, Sulfuric acid, Hydroxides, Chlorine compounds, Iodine compounds, Ozone, Sulfates, Hydrogen sulfide, Sulfites.

Satisfactory methods for the chemical analysis of air will evolve only when analytical chemists are also adequately trained in physical chemistry and physical meteorology. A second requirement is further development of methodology. Not until the development is more or less complete will it be possible to undertake a third major task, that of making many parallel investigations in micrometeorological as well as world-wide networks under the most varied atmospheric conditions and at various heights above the ground. Of the chemical methods available today, two methods developed in Europe are briefly discussed: the absorption-tube method for detecting the presence of secondary gaseous substances, and the condensation method for the analysis of water-soluble atmospheric constituents which form condensation nuclei. Results obtained by both methods are evaluated and suggestions are made for further research. To explain condensation (cloud formation), the chemist must have recourse to intermolecular forces and, in the last analysis, to processes of atomic energy. Four types of short-range molecular forces are discussed in light of existing knowledge. It is anticipated that the first chemical techniques developed for the field of dynamic meteorology may be connected with determinations of the pH value and the reduction power of aerosols. Such uses would provide accurate information about the motion of air masses and the degree of turbulence.
APTIC-25925

DETECTION OF POLLEN FLAVONOIDS BY FLUORESCENCE ON IMPREGNATED PAPERS.

Mikrochim. Acta, vol. 1:95-100, 1959. 16 refs.
G. E. Inglett, R. R. Miller, and J. P. Lodge.
Identifiers: *Pollens, *Paper chromatography, *Fluorescence.

Limits were established for the identification of pollen flavonoids on chromatographic paper impregnated with aluminum, beryllium, and zirconium ions. The limiting concentrations of the flavonoid or flavonoid glycoside are recorded in tabular form. Most of the flavones and flavonols listed give inner chelation compounds with aluminum, beryllium, and zirconium ions if they have an available 3 and/or 5 hydroxyl group. A neighboring 6-hydroxyl or methoxyl group seems to hinder formation of a fluorescent chelation complex. Paper chromatography revealed the presence of dactylin and isoquercitrin in extracts of orchard grass pollen. Only dactylin was found in timothy pollen extracts.
APTIC-25928

A PRACTICAL METHOD FOR THE RAPID DETERMINATION OF LEAD WHEN FOUND IN THE ATMOSPHERE.

J. Ind. Hyg., 18 (10):724-732, Dec. 1936. 22 refs.
G. C. Harrold, S. F. Meek, and F. R. Holden.
Identifiers: *Colorimetry, *Lead compounds, Samplers, Impingers.

Modifications of the dithizone analysis for lead are described that should permit rapid and accurate determination of up to 700 mg of lead per 10 cu m of air or less than 0.001 mg of lead in 10 cu m of air. The determinations are based on variations in tint produced by the addition of excess dithizone. The procedures require no colorimeter and only an air sampler and impinger for collection. A detailed description is given of the preparation of unknown samples and the standard solutions on which analyses are based. Results obtained with the modificated procedures are shown in tables.
APTIC-25932

DEVELOPMENT OF A LASER SYSTEM FOR ABSOLUTE ATMOSPHERIC DIFFUSION MEASUREMENT OF A GASEOUS TRACER MATERIAL. (FINAL REPORT).

Battelle Memorial Inst., Richland, Wash., Pacific Northwest Lab., OAR Contract PRO CP 69-825, Proj. 7655, Task 765501, Work Unit 76550101, AFCRL-70-0258, BNW-139, 43p., Dec. 1969. 7 refs. NTIS, DDC: AD 709248
Walt Vali, Todd Gilmore, and Richard L. Gordon.
Identifiers: *Lasers, *Diffusion, *Tracers, *Feasibility studies, Fluorescence, Light scattering.

Results are reported of experiments designed to identify a gaseous tracer material for use in a laser system for real-time observation of atmospheric diffusion. Three possible mechanisms of interaction between light and gas molecules are discussed: resonance scattering, Rayleigh scattering, and fluorescence. Wavelength requirements connected with the resonance scattering approach require additional laser development. Successful application of the Rayleigh scattering technique awaits identification of a gas with a Rayleigh scattering cross section near 10 to the minus 21st power sq cm. The fluorescence approach is feasible at this time with hexafluoroacetone as the tracer gas and a nitrogen laser as the light source. Preliminary system design considerations are presented in an appendix. (Author abstract modified)
APTIC-25936

A METHOD FOR THE ESTIMATION OF SULPHUR TRIOXIDE.

Chem. Ind. (London), no. 11:461-462, March 18, 1967. 4 refs.
R. Bent, W. R. Ladner, and W. J. Mullin.
Identifiers: *Sulfur trioxide, *Infrared spectrometry, *Continuous monitoring, Great britain, Carbon dioxide.

A method of estimating sulfur trioxide is based on passing a gas stream containing SO3 plus oxygen through a gas cell located in an infrared spectometer, which monitors the optical density of SO3 absorption. On leaving the gas cell, the SO3 enters a column packed with oxalic acid crystals, liberating carbon dioxide from the acid. The concentration of CO2, which is taken as equivalent to SO3, is then analyzed by an infrared analyzer connected to the column outlet. In this way, SO3 can be continuously monitored at levels down to 1 ppm. If sulfur dioxide is present the infrared analyzer should be fitted with a suitable filter to prevent interference from SO2.
APTIC-25940

THE DESIGN AND CONSTRUCTION OF A PHOTOELECTRONIC SCANNING MACHINE FOR SIZING MICROSCOPIC PARTICLES.

Brit. J. Appl. Phys., Supplement 3: S165-S173, 1954. 19 refs.
P. G. W. Hawksley, J. H. Blackett, E. W. Meyer, and A. E. Fitzsimmons.
Identifiers: *Particle counters, *Photometric methods, *Particle size, Great britain, Particulate sampling, Design criteria.

The design of photoelectric scanning machines for counting and sizing particles directly, without the intermediate photographic enlargement stage used in previous machines, is described. A flexible construction is employed so that both track and line scanning methods can be investigated. is restricted to confirming the theory of track scanning given by Hawksley. This requires, for its simplist practical application, that the particles be of constant optical density. Present indications are that observations from the direct scanning of particles smaller than about 5 micron cannot be interpreted unless account is taken of diffraction effects present at such sizes. Data are presented on the performance of a machine constructed for sizing particles dispersed on microscope slides. The size distribution of a sample of coal particles down to 5 micron as determined by the scanning machine agrees with that from a visual count.
APTIC-25943

ULTRAVIOLET ABSORPTION OF ALIPHATIC NITRO COMPOUNDS IN THE PRESENCE OF A BASE.

Anal. Chem., vol. 32:1712-1713, Nov. 1960. 4 refs.
Joseph H. Gast, and Frances L. Estes.
Identifiers: *Ultraviolet spectrometry, *Aliphatic hydrocarbons, *Organic nitrogen compounds, Lithium compounds, Sodium hydroxide.

Attempts were made to obtain ultraviolet absorption spectra in the 240 to 340 millimicron region of representative nitro compounds in sodium hydroxide solutions, with and without phosphate buffers, and lithium hydroxide solutions. Data on the effects of time, concentration, and pH on absorbance are presented to show the difficulties inherent in using the reaction of short-chain mononitro compounds with bases as a method of detecting and quantitatively determining the compounds.
APTIC-25948

AIR SAMPLING AND ANALYSIS OF LEAD ON PAPER.

Am. Ind. Hyg. Assoc. J., 22 (2):86-89, April 1961. 12 refs.
Stanley H. Judd, and Bernard D. Tebbens.
Identifiers: *Tetraethyl lead, *Paper chromatography, Combustion products, Sampling methods, Filters, Cobalt compounds, Copper compounds.

An economical, reasonably accurate method for measuring airborne lead, as well as some other metals, has been developed using the principles of paper chromatography. Manual samples are obtained by use of glass or aluminum flanges, holding the filter paper tape and connected to a vacuum source through a flow meter. Whatman No. 54 filter paper was found to be superior, while a hydrochloric acid-butanol solvent was selected to dissolve the lead and provide adequate separation from interfering substances. A large number of reagents were tried, but dithizone as a 0.1% solution in chloroform gave the best results at a pH of 11.0. A chamber study was made on the combustion products of the solution of tetraethyl lead in alcohol. The system is also applicable to bismuth, cadmium, cobalt, copper, manganese, mercury, and tin.
APTIC-25949

SPECTROPHOTOMETRIC DETERMINATION OF BERYLLIUM AND FLUORIDE USING CHROME AZUROL S.

Anal. Chem., 31 (1):152-155, Jan. 1959. 14 refs.
(Presented at the American Chemcial Society Meeting, 132nd, New York, Sept. 1957.)
Louis Silverman, and Mary E. Shideler.
Identifiers: *Fluorides, *Beryllium compounds, *Spectrophotometry, Uranium compounds.

Chrome Azurol S (the sodium salt of 3'-sulfo-2',6-dichloro-3,3'-dimethyl-4-hydroxyfuchson-5,5-dicarboxylic acid) was applied to the spectrphotometric determination of beryllium and fluoride. The colored beryllium-Chrome Azurol S complex is formed at pH 6.0 in the presence of a pyridine-hydrochloric acid buffer, which enhances the sensitivity of the dye to beryllium and increases the sensitivity of the metal-dye complexes to fluoride. The procedure described can be used to determine from 1 to 30 gamma of fluoride per 50-ml vol with a precision of plus or minus 1 gamma, and from 0.2 to 10 gamma of beryllium per 50 ml vol with a precision of plus or minus 2 gamma. Studies were made on the variables of the system, interferences, and on an ion exchange method of separate uranium form beryllium. (Author abstract modified)
APTIC-25952

MEASUREMENT OF PARTICLE-SIZE DISTRIBUTION IN CLOUDS AND FOGS.

Bull. Acad. Sci. USSR, Geophys. Ser. (English translation from Russian of: Izv. Akad. Nauk SSSR, Ser. Geofiz.), no. 4:111-115, 1957. 5 refs.
A. E. Mikirov.
Identifiers: *Condensation (atmospheric), *Photometric methods, *Particle size, Ussr, Particulates, Lower atmosphere, Clouds, Fog, Light scattering.

A photoelectric apparatus for measuring particle-size distribution in clouds and fogs is described; it employs the dark field method in conjunction with a rational use of the scattering index. As determined by laboratory test and calibrations, the instrument allows measurement of particle sizes from a diameter of two micron upwards. In field trials at 3050 m, particle-size distributions were determined in several clouds in calm weather. The particle-size distributions for two clouds are shown. The first spectrum was constructed from 8874 particles; the second, from 9950.
APTIC-25955

ANALYTICAL METHODS FOR DETERMINATION OF AEROSOLS WITH HELP OF MEMBRANE ULTRAFILTERS. VI. ON THE MECHANISM OF MEMBRANE ULTRAFILTER ACTION.

Collection Czech. Chem. Commun. (Prague), vol. 28:2886-2894, 1963. 16 refs. Part V: Ibid., vol. 26, p. 1991, 1961.
K. Spurny, and J. Pich.
Identifiers: *Flow rates, *Membrane filters, Czechoslovakia, Aerosols, Radioactive tracers, Permeability, Surface properties.

Porosity, extent impaction, diffusion, gravitation, direct interception and sieve effects on the mechanism of filtration are characterized for the capillary model of membrane ultrafilter. So called flow rate characteristics and selectivity of membrane ultrafilters are studied by means of radioactive labelled aerosols. The results are in good qualitative agreement with the theory. (Author abstract)
APTIC-25956

COLLECTION OF GAS-BORNE DUST PARTICLES BY MEANS OF AN ASPIRATED SAMPLING NOZZLE.

Brit. J. Appl. Phys., vol. 10:26-32, Jan. 1959. 8 refs.
S. Badzioch.
Identifiers: *Dusts, *Aspirators, Great britain, Gas sampling, Flow rates.

The efficiency of collection of gas-borne particles by an aspirated sampling nozzle is investigated theoretically and experimentally. The efficiency is shown theoretically to depend on the ratio of the velocity of aspiration into the sampling nozzle to the velocity of the undisturbed gas stream, and the ratio of a length representing the distance of disturbance of the nozzle to the 'range' of a particle. The 'range' is defined as the distance a particle would travel before coming to rest if projected into still gas with a velocity equal to that of the gas stream. In the range of conditions investigated experimentally, which included nozzles of 0.65 to 1.90 cm diameter aspirating from turbulent gas streams, the length representing the upstream disturbance was a function of the diameter of the nozzle. (Author abstract)
APTIC-25957

TECHNIQUES FOR DETERMINING THE TURBIDITY OF THE ATMOSPHERE.

Tellus (Uppsala), 13 (2):214-223, Sept. 1961. 26 refs.
Anders Angstrom.
Identifiers: *Mathematical analyses, *Turbidimetry, Aerosols, Turbidmetry, Absorption, Solar radiation, Light scattering.

The transmission of solar radiation through the atmosphere is mainly dependent on three factors; scattering by molecules, scattering and absorption by solid and liquid particles, and selective absorption by gaseous constituents. In previous theoretical investigations, the author formulated an equation defining a 'turbidity coefficient' (beta) and the wavelength dependence of extinction by atmospheric aerosols (alpha). Together these characterize the scattering and absorbing aerosol. The results of recent derivations of turbidity, expressed through beta are summarized. In general, the results show the dependence of atmospheric turbidity on time of year, air mass, latitude, and local conditions. Based on recent measurements of integral radiation values with glass filters, a simplified method is proposed for determining beta and alpha. The accuracy of the method depends on a precise knowledge of filter constants.
APTIC-25959

MICROSCOPIC IDENTIFICATION OF TOXIC DUSTS.

Occupational Health Rev., 16 (3)3-7, 1964. 5 refs.
Germain C. Crossmon.
Identifiers: *Microscopy, *Refractive index, *Dusts, Toxicity, Measurement methods, Dispersion, Light scattering.

The usual procedure for identifying toxic dusts is to examine the sample with a polarizing microscope or a laboratory type microscope equipped with polorizing accessories. Identification is simplified by a technique known as dispersion staining in which dusts are identified by the dispersion of refracted colors. Dust samples are mounted on glass slides in liquids of high dispersion power. If a beam of white light is focused on the slide, only the color for which the particles and liquid are equal in refractive index will be transmitted, the remaining colors of white light being scattered. Both dark-field or dark-contrast phase illumination can be used, and the required accessories added to either polarizing or laboratory microscopes.
APTIC-25970

USE OF ELECTROLYSIS TO DETERMINE TRACE AMOUNTS OF LEAD, COPPER, AND ZINC IN STUDIES OF THE ATMOSPHERE.

(Primeneniye elektroliza dlya opredeleniya mikrokolichestv svintsa, medi i tsinka pri issledovaniyakh vozdushnoy sredy). Text in Russian. Zavodsk. Lab. (Moscow), 15 (10):1165-1171, 1949. 6 refs.
F. D. Shikhvarger.
Identifiers: *Copper compounds, *Lead compounds, *Zinc compounds, *Electrolysis, *Electrochemical methods, Ussr, Particulates, Colorimetry, Turbidimetry, Electric charge, Voltage, Temperature.

A laboratory arrangement for electrolytic separation of trace metals collected in air samples is described. This arrangement features a rotating (500-700 r/m) electrolyte (2% nitric acid) with stationary electrodes. Experiments were performed with an anode current density of 2.0-5.0 ma/sq m (anode area -- 52 sq m), a cathode current density of 1.0-3.0 ma/sq m (cathode area -- 26 sq cm), and a total current not exceeding 20-50 ma at 2.2-2.6 volts. Electrolysis was performed at 50-20 C over a period of 30-40 min. The metal thus collected is washed from the electrodes and determined colorimetrically or nephelometrically. Analysis of air samples taken at industrial installations has demonstrated the superiority of this method over conventional chemical analysis.
APTIC-25979

INSTRUMENTATION IN POLLUTION CONTROL.

Ind. Water Eng., 7 (6):22-31, June 1970.
F. Curtis Snowden.
Identifiers: *Sewage treatment, *Electroconductivity analyzers, *Instrumentation, Chemical processing, Plating, Primary metallurgical processing, Sludge, Water pollution, Infrared spectrometry, Oxygen, Colloids, Emulsions, Ph, Temperature.

The four primary measurements necessary to define water quality, whether it be in natural streams or in plant effluents, are: pH, conductivity, dissolved oxygen, and temperature. Methods of measurement are discussed for these factors, as well as for the wastes before they leave a plant or treatment facility. Treatment of plating wastes involves the measurement of oxidation-reduction potential and pH, and in some cases monitoring of the final effluent by electrolytic conductivity.

Most plating wastes contain cyanide, chroma, or a combination of these two extremely toxic materials. Another common industrial waste treatment problem is the neutralization of acids and bases from such operations as the manufacture of chemicals and steel, the refining of petroleum and the finishing of metals. Activated sludge processes bring organic wastes into contact with living microorganisms in large aeration tanks in which bacteria grow as suspended agglomerates. The measurement of the properties of colloids, emulsions, and other suspensions has long posed special problems to the analyst. Future instrumentation requirements are indicated, and air pollution instrumentation is also mentioned. There are seven major categories of air pollutants which can be detected: carbon monoxide, sulfur oxides, nitrogen oxides, particulate matter, unburned hydrocarbons, reduced sulfur gases, and oxidants. Infrared analyzers are also described.
APTIC-25990

LOW VOLUME AIR SAMPLER: RESEARCH ON THE MEASUREMENT OF THE PARTICULATES IN THE AIR WITH LOW VOLUME AIR SAMPLER.

(Low volume air sampler niyoru taiki chuno fuyu funjin sokutei ni kansuru kenkyu). Text in Japanese. Kuki Seijo (Clean Air-J. Japan Air Cleaning Assoc., Tokyo), 8 (6):30-37, Dec. 1970. 13 refs.
K. Fujisawa, and E. Yamashita.
Identifiers: *Low-volume samplers, *Particulates, *Continuous monitoring, Japan, Air quality measurements, Samplers, Hi-vol samplers, Digital methods.

Estimates of regional air pollution require that average variations in pollutant concentrations be determined over periods of one month or three months. Therefore, continuous sampling and chemical analysis of particulates are necessary. At the present time, monitoring is done mainly with digital dust meters and high-volume samplers; the former do not yield material for ingrediental analysis, and the latter air not suitable for serial sampling. The application of a low-volume sampler to regional air measurements is discussed. In a comparative continuous sampling program, data obtained with a low-volume sampler with an open shelter correlated well with average volumes determined with a high-volume sampler; data obtained with a low volume sampler with a closed shelter correlated very well with the volume determined with a digital dust meter.
APTIC-26007

QUANTITATIVE DETERMINATION OF METALLIC AIR POLLUTANTS BY EMISSION SPECTROSCOPIC ANALYSIS.

(Hakko bunko bunsekiho ni yoru taikichu no kinzoku seibun no teiryo). Text in Japanese. Bunseki Kiki (Analysis Instr.), 8 (8):508-517, Aug. 1970. 25 refs.
A. Matsumae, and T. Hasegawa.
Identifiers: *Metal compounds, *Spectrophotometry, National air sampling network (nasn), Japan, Electroconductivity analyzers, Hi-vol samplers.

A spectroscopic method is described for determining the metallic compounds in a sample of air collected with a High Volume Sampler. Problems which are mentioned concerning the method of the U. S. National Air Sampling Network include contamination of the sample, selection of glass filters for the sampler, evaporation of the volatile metallic compounds when the sample is heated to burn the combustible organic compounds, extraction efficiency with nitric acid, and selection of the method of excitation, buffers, and standards. Another method is described where the collected sample is placed directly on a graphite electrode. However, it is also necessary to correlate the results of quantitative analysis with the sources of pollution. The authors previously investigated and clarified the relations between vanadium and sulfur oxides concentrations, lead concentrations, traffic volume, and the particle size distribution of the metal compounds.
APTIC-26009

PROBLEMS ON MEASUREMENT OF THE CONCENTRATION OF PARTICULATE CONTAMINANTS IN SMOKE DUST.

(Endo hai gasuchu no baijin nodo sokutei no shomondai). Text in Japanese. Bunseki Kiki (Analysis Instr.), 8 (8):528-535, Aug. 1970. 12 refs.
Y. Nagami.
Identifiers: *Particulates, *Sampling probes, Japan, Stack gases, Dusts, Smokes, Design criteria.

A very common method of measuring particulate concentrations is to make ports in a duct, insert probes, suck a certain amount of exhaust gas through the probes using a pump, collect the particulate sample, and measure the amount collected. Since the unit of the computed concentration of particulate contaminants is similar to the unit of air quality standards, this is an important method, as well as being fundamentally simple. However, the question arises as to whether the particulate concentration of the exhaust gas flowing into the duct is equal to the sample gas sucked into the collection apparatus. Another problem pertains to whether the sample is representative or if the values vary with different sampling points. The selection of sampling points and the location of the ports is important for a meaningful sample. In addition to these problems, another commonly used sampling instrument, the dust tube, is also discussed.
APTIC-26020

ON MEASURING DUST SUSPENDED IN THE ATMOSPHERE - MAINLY ON THE RECENT AND MOST FREQUENTLY USED INSTRUMENTS.

(Taikichu no fuyu funjin sokuteiho ni tsuite - saikin no hanyo kiki o chushin toshite -). Text in Japanese. Bunseki Kiki (Analysis Instr.), 8 (8):493-500, Aug. 1970. 11 refs.
M. Terabe.
Identifiers: *Particulate sampling, *Samplers, Japan, Dusts, Suspended particulates, Spot tests, Turbidimetry, Particle size, Cascade samplers, Hi-vol samplers, Digital methods.

The most frequently used devices for surveying suspended dust are high-volume samplers, tape samplers, and digital dust meters. Newer instruments that are attracting attention are nephelometers, Andersen samplers, and cascade centripeters. A high-volume sampler is convenient for obtaining weight concentration (micrograms/cu m) and analysis samples, and is widely used by air sampling networks in Japan. A tape sampler measures optically the degree of blackening of a spot caused by air filtering through the tape. In the U. S., Cohs/1000 ft is the most frequently used unit. The digital dust meter determines CPH from scattered light, then translates it into weight concentration. Despite a few attendant problems, this instrument is popular in Japan, where it originated. The nephelometer, developed by Washington University, is of interest since it calculates dust concentration (micrograms/cu m) and Lv from bscat due to scattered light. Andersen samplers and cascade centripeters obtain particulate diameter distribution from weight distribution. Measurement methods are described for these instruments. The relationship between total dust (microgram/cu m) and digital dust meter measurements (CPH) is shown.
APTIC-26047

A NEW ROAD TO ACCELERATED GRAIN-SIZE ANALYSIS IN THE RANGE FROM 10 MICRON TO 0.1 MICRON IN DIAMETER.

(Ein neuer Weg zur beschleunigten Korngroessenanalyse im Bereich von 10 micron bis 0.1 micron Durchmesser). Text in German. Staub, Reinhaltung Luft, 30 (11):456-458, Nov. 1970. 1 ref.
Hans-Achim Boewing, and Theodor Gast.
Identifiers: *Particle size, *Centrifugal separators, *Gravity settling, Germany, Particulate classifiers.

A new grain size analyzing sedimentation method is described for grain sizes from 0.1 to 10 micron. The method is based on the principle of sedimentation in a centrifugal force field and is analogous to the sediment weighing method. An initially homogeneous suspension induces a pressure which, because of higher median density, is higher than that of the pure liquid. Grains separated within a measuring range cause a reduction in pressure from which the quantity of the particles can be determined. Theoretically, for a homogeneous single grain suspension, the course of pressure distribution is linear when the ratio between the measuring length in the container to its outer radius on the centrifuge remains sufficiently small. A sedimentation centrifuge of 670 to 1350 revolutions/minute with a 5 cm long and 2 cm wide cylinder is used which continuously registers sedimentation in the form of a sedimentation curve from which the residual sum curve can easily be derived. The method was evaluated by numerous tests and the deviation between individual analyses was within a 5% limit.
APTIC-26060

REPRESENTATION OF PARTICLE-SIZE DISTRIBUTIONS BY MEANS OF A SIMPLE SPECTROMETER AS AN ACCESSORY TO SCATTERED LIGHT MEASURING DEVICES.

(Darstellung von Teilchengroessenverteilungen mittels eines einfachen Spektrometers als Zusatz zu Streulichtmessgaraeten). Text in German. Staub, Reinhaltung Luft, 30 (11):483-487, Nov. 1970. 4 refs.
Axel Boden, and Wilfried Coenen.
Identifiers: *Particle counters, *Particle size, *Spectrometry, Germany, Particulates, Aerosols, Calibration methods, Instrumentation, Light scattering.

A Bausch and Lomb counter and a Siemens spectroscope are used as accessories to scattered light measuring devices. The dust counter measures the scattered light of individual particles at an angle from 23.75 to 53-75 degrees to the direction of the primary impulse stream. The duration of the impulse depends on the period of dwell of the particles in the impulse light ray, thus on the flow velocity of the particles. Each electric impulse causes the appearance of a perpendicular line on the screen of the impulse spectroscope whose position on the X-axis of the screen is determined by the strength of the impulse; smaller impulses are registered on the left side and large impulses are registered on the right side. The electrical adjustment and synchronization of the two instruments and the calibration of the measuring arrangement are described; the resolution power and the influence of time constants of the system on the form of impulses are determined. The applicability of the method is demonstrated on monodispersed latex aerosols and on atmospheric aerosols.
APTIC-26062

COMPLEXOMETRIC DETERMINATION OF SULFUR TRIOXIDE AND SULFUR DIOXIDE IN WASTE PROCESS GASES.

Ind. Lab. (USSR) (English translation from Russian of: Zavodsk. Lab.), 36 (6):842-843, June 1970. 1 ref.
N. I. Pevnyi, Z. A. Fioletova, V. I. Zhikhareva, and N. N. Kuvaldina.
Identifiers: *Complex formation, *Colorimetry, *Sulfur oxides, Ussr, Stack gases, Sulfur dioxide, Sulfur trioxide.

A new method for determining total sulfur oxides in waste gases entails absorption of sulfur dioxide and sulfur trioxide by an oxidative medium, precipitation of the sulfate ion with a standard

solution of lead acetate, and titration of the excess with EDTA solution, using xylenol orange as indicator. Titration is performed in acetone without filtering the precipitate and with starch as a protective colloid. Results are presented for the comparative determination of sulfur oxides in artificial gas mixtures by this complexometric method and the iodimetric method.
APTIC-26067

ACTIVATION ANALYSIS OF AIRBORNE SELENIUM AS A POSSIBLE INDICATOR OF ATMOSPHERIC SULFUR POLLUTANTS.

Environ. Sci. Technol., 5 (1):74-77, Jan. 1971. 12 refs.
K. K. Sivasankara Pillay, Charles C. Thomas Jr., and James A. Sondel.
Identifiers: *Neutron activation analysis, *Selenium compounds, *Sulfur compounds, New york state, Urban areas, Fuels, Air quality measurements.

Periodic sampling of air pollutants in the Buffalo area was done over a one-year period. The samples were analyzed for both sulfur and selenium content. The results of gravimetric analysis of sulfur and neutron activation analysis for selenium of these samples are summarized. The selenium/sulfur ratio of each set of samples was calculated to determine whether a constancy in this ratio exists. The results show that most of the values of the selenium/sulfur ratio in the atmosphere of Buffalo ranged from 0.00005 to 0.00016 (average, 0.00009) for the period of the studies. These results are contrasted with Se/S ratios in fossil fuels reported earlier. Knowing the Se/S ratio of air pollutants in a region, neutron activation analysis of selenium can be used for an estimate (an order of magnitude or less) of the sulfur content of air pollutants. (Author abstract modified)
APTIC-26069

METHODS OF SAMPLING SUSPENDED DUST FOR MEASURING THE FREE SILICA CONTENT.

(Metody prob vzveshennoy pyli dlya opredeleniya soderzhaniya svobodnoy dvuokisi kremnya). Text in Russian. Gigiena Truda i Prof. Zabolevaniya, no. 6:47-48, 1970.
Yu. P. Pavlenko, I. P. Petrov, and N. A. Zhorov.
Identifiers: *Dusts, *Aspirators, *Silicon compounds, Portable, Ussr, Mining.

A 12-kg portable water-ejection air sampler designed for use in mines is described. This device can be used where a pressurized water supply is available, and reduces, by a factor of 50-70 times, the time required to take dust samples suitable for chemical analysis (up to 1 gram) as compared with the commonly used AER aspirator sampler.
APTIC-26076

OZONE CHEMILUMINESCENT STUDY. FINAL REPORT. PART II. RADIOACTIVE OZONE GENERATOR.

Research Triangle Inst., Research Triangle Park, N. C., Engineering and Environmental Sciences Div., NAPCA Contract CPA-22-69-7, 45p., Feb. 1970. 7 refs. NTIS: PB 194117
H. G. Richter.
Identifiers: *Design criteria, *Testing facilities, *Ozone, Continuous, Operating variables, Maintenance, Calibration methods, Instrumentation, Isotopes, Flow rates, Beta particles, Pressure.

The evaluation of a radioactive ozone generator designed and fabricated by Brookhaven National Laboratory is reported. The parameters involved in arriving at the choice of strontium 90 as an emitter are discussed; they include activity, cost, and the amount of shielding required as a result of the emitter activity. A physical description and theory of operation of the generator are provided. The ozone generator using strontium 90 as an energy source produces ozone at a maximum concentration of about 0.50 ppm. A combination of physical and chemical phenomena occurring in the radiation field makes the ozone concentration from any given orifice independent of flow rate, provided the pressure in the chamber exceeds 400 psig. The ozone concentration is not continuously variable from low values up to a maximum. Maximum ozone concentration is obtained from orifice 1 only after several days operation at a fixed pressure (above 400 psig). Shorter times may produce maximum ozone concentration from other orifices. The device should prove useful if it is set up as a standard source of ozone and always kept in operation. Its use as a standard source in intermittent operation is not recommended. Recommendations pertaining to the manner of operation of the generator in continuous mode are presented. A Brookhaven produced instruction manual (calibration, operation, and maintenance) is included as an appendix.
APTIC-26082

ODOR INTENSITY.

Am. Perfumer Cosmet., vol. 79:43-48, Feb. 1964. 7 refs.
Louis Appell.
Identifiers: *Odors, *Odorimetry, Mathematical analyses.

A method is given for computing odor intensity with and without the use of standard solutions. It is based on principles that have been applied in the measurement of visual brightness and loudness of sound. Specifically, it takes the principle that the intensity of the sensation is proportional to the logarithm of the stimulus as the basis for the classification of odor intensity. Preliminary results are given for the application of the method to some aromatics and mixtures. In addition, equations are derived for estimating odor threshold values.
APTIC-26096

THEORY OF PARTICLE SIZING AND COUNTING BY TRACK SCANNING.

Brit. J. Appl. Phys. Suppl., no. 3: S125-S132, 1954. 16 refs.
P. G. W. Hawksley.
Identifiers: *Particle counters, *Photometric methods, *Particle size, Great britain, Photoelectric phenomena.

In recent years, methods have been sought of applying photoelectric detecting systems, combined with high-speed, pulse-counting devices to the determination of the number and size distribution of particles dispersed in a plant field of view (of dust particles or spray droplets, for example). All proposed methods broadly involve scanning the field with a light beam such that the presence of particles on the scanning line or track modulates the output of the photocell. The number, length, or height of pulses may then be recorded by suitable discriminating and counting circuits. The theoretical problem is to translate observations derivable from scanning into the number and size distribution of the particles in the field. This information can be obtained from observations of the numbers intercepted by tracks of different widths. Unlike the intercept line method of sizing, calculations are simple and not restricted to circular particles.
APTIC-26097

ATOMIC ABSORPTION SPECTROSCOPY OF ALUMINUM.

Anal. Chim. Acta, vol. 28:392-394, 1963. 10 refs.
Fred B. Dowling, C. L. Chakrabarti, and George R. Lyles.
Identifiers: *Aluminum compounds, *Atomic absorption spectroscopy, Spectrophotometry, Temperature.

The apparatus, reagents, and procedure used in the successful determination of aluminum by atomic absorption spectroscopy using either oxy-acetylene or oxy-hydrogen flames boosted by an organic aerosol containing an aluminum complex are described. The oxy-acetylene flame increases the sensitivity about ninefold over that of oxy-hydrogen; actual experiments using an oxy-acetylene flame established a 36 ppm detection limit. The most critical experimental parameter controlling sensitivity was found to be the flame position through which radiation passed from the hollow cathode lamp used as radiation source. A highly reducing flame is calculated to be the most favorable medium to inhibit oxide formation. Higher sensitivity (3 ppm or better) can be achieved with a much higher temperature such as a spark, but only at the sacrifice of simplicity and low cost.
APTIC-26098

AIR POLLUTANT ANALYSIS.

Natl. Bur. Std. (U. S.) Tech. Note no. 545:82-106, 1970. 7 refs.
J. K. Taylor.
Identifiers: *Criteria, *Analytical methods, *Measurement methods.

In view of increasingly stringent air quality standards, the search for better and more sensitive methods for analyzing atmospheric contaminants is expected to be an active area of research. The current state of the art of analysis is relatively poor because there has been little recognition of the need to develop analytical methods specifically suited for environmental analysis. Techniques have been borrowed from other disciplines and, except in research establishments, measurements have predominantly been made by technicians and engineers with little feel for analysis. Continuous monitoring methods tied in with data acquisition systems and standard reference materials are also needed. Existing methods for determining specific gaseous pollutants and particulates are summarized. The disadvantages or possibilities of each are noted.
APTIC-26106

CONTINUOUS MEASUREMENT OF LOW GRADE HYDROCARBONS IN URBAN ATMOSPHERE.

(Toshi taiki chu no teikyu tanka suisorui no rensoku sokutei). Text in Japanese. Bunseki Kiki (Analysis Instr.), 8 (8):518-527, Aug. 1970. 20 refs.
H. Watanabe, T. Nakadoi, and Y. Hirata.
Identifiers: *Hydrocarbons, *Chromatography, Japan, Smog, Automatic methods, Continuous monitoring, Research methodologies, Carbon monoxide, Nitrogen oxides.

The continuous and automatic measurement of air pollutants by chromatography was found to be useful for the analysis of the low mass hydrocarbons from ethane to pentane. Rather than with the total hydrocarbons, the concentration of the C2-C5 hydrocarbons was found to have a high correlation with the carbon monoxide concentration present at a several dozen ppb concentration when smog is very dense. In many previous photochemical experiments, concentrations of nitrogen oxide and hydrocarbons were unrealistically high, and it is recommended to use amounts similar to what actually exist in the atmosphere. Compounds such as n-butane could form high concentrations of oxidant when reacting with nitrogen oxides; it would be misleading to underestimate it as an air pollutant.
APTIC-26109

A NEW DEVICE FOR CONTINUOUS DETERMINATION OF SULFUR DIOXIDE.

(Nohtan dench o liyoh sooloo nisanka ioh no lenzokoo sokootei). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4 (1):24, 1969. 1 ref. (Proceedings of the Japan Society of Air Pollution Annual Meeting, 10th, 1969.)
R. Endo, T. Oyake, and T. Kohgo.
Identifiers: *Potentiometric methods, *Sulfur dioxide, Japan, Continuous monitoring.

A new continuous measuring instrument for sulfur dioxide utilizing the reaction between sulfur diox-

ide and iodine was studied. Iodine solution of constant concentration, which is obtained by oxidizing 5% potassium iodide solution through electrolysis with weak and constant current (0.5 to 1.5 mA), flows, through a filter disk, out of a glass cell and reacts with sulfur dioxide in sample gas outside the cell, reducing its concentration. Thus, a potential difference occurs between platinum electrodes placed inside and outside the cell which is measured, and this gives the sulfur dioxide concentration. To test this instrument, low-concentrated standard sulfur dioxide is obtained by diluting sulfur dioxide diffusing through the membrane of a Teflon tube containing liquid sulfur dioxide and its concentration is determined by the rosaniline-formalin method. As a result, at a pH of 6.5 to 7.1 in potassium iodide solution, it shows smaller variation of measured values, good reproducibility, and better collection efficiency (about 36%). As an example, a calibration curve is linear within 0.5 to 10 ppm of sulfur dioxide with 0.5 mA of electrolysis current, pH of 7.1, and 450 ml/min of sampling flowrate.
APTIC-26120

ON HYDROGEN FLUORIDE AIR POLLUTION MONITORING DEVICE.

(Fukka suisogasu taiki osen kanshi sochi ni
tsuite). Text in Japanese. Bunseki Kiki (Analysis
Instr.), 8 (8):546-549, Aug. 1970.
Akira Nakazawa.
Identifiers: *Colorimetry, *Hydrofluoric acid, Diurnal, Japan, Automatic methods, Continuous monitoring, Chlorine compounds, Nitrogen dioxide (no2), Sulfur dioxide.

In a new device for analyzing hydrogen fluoride, air to be tested is continuously exposed to the reagent, the chlorate solution of zirconium eriochrome cyanine R. In proportion to the concentration of fluoride in atmosphere, zirconyl fluoride is produced, and the reagent loses its color. The degree of color loss is measured by a colorimeter to obtain the amount of fluoride in the atmosphere that came in contact with the reagent. The analyzer, which is illustrated in a flow diagram, has the dimension 90 by 40 by 40 cu cm and weighs 60 kg. Its operation requires 100V AC and about 300W power. Control, measurement, reagent tank, and power as well as pump sections are all housed in one cabinet. The measurement section includes the colorimeter among other mechanisms. The operation of the analyzer consists of setting the timer (100 min), adjusting the air intake to 10 l/min, and letting the machine automatically record the concentration of fluoride in the atmosphere. The value of concentration can be obtained by comparing the data to the calibration line. An example of a measurement is shown; the concentration is almost zero at night, and increases from morning to the afternoon and decreases in the evening. The reliability of the device is accurate to 1 ppb, and can also be used for measuring trace amounts of gases such as sulfur dioxide, chlorine, and nitrogen oxides.
APTIC-26121

MEASUREMENT OF GASEOUS AIR POLLUTION.

(Gasujo taiki osenshitsu no solutei). Text in
Japanese. Bunseki Kiki, (Analysis Instr.), 8
(8):536-545, Aug. 1970. 34 refs.
Noboru Yamate.
Identifiers: *Pollutants, *Analytical methods, *Measurement methods, Manual, Japan, Chemical methods, Iodimetric methods, Column chromatography, Saltzman method, Spectrophotometry, Continuous monitoring, Electroconductivity analyzers, Intermittent monitoring, Hydrochloric acid, Hydrocyanic acid, Aldehydes, Chlorine compounds, Fluorine compounds, Hydrocarbons, Nitric oxide (no), Nitrogen dioxide (no2), Sulfur oxides, Ozone, Hydrogen sulfide, Fluorescence.

Manual and continuous methods of measuring the major gaseous pollutants are reviewed. Manual methods employed for analyses of sulfur oxides are the rosaniline, molybdic acid-barium, lead peroxide, and detector filter paper methods. Continuous methods are the iodine starch-light absorption, rosaniline light absorption, and electroconductivity methods. The Saltzman and naphthylethylene diamine methods are employed for manual analyses of nitric oxide and nitrogen dioxide; and the Saltzman light absorption method is used for continuous analysis. Carbon monoxide is manually analyzed by infrared analysis, gas chromatography, detector tubes, and the hopcalite method; it is continuously analyzed by infrared analysis, gas chromatography, the mercuric oxide method, and the hopcalite method. The manual method of analyzing hydrogen sulfide is the methylene blue method; the continuous method; and the filter paper coloring method. Hydrocarbons are measured manually be gas chromatography and continuously by hydrogen flame ionization. Aldehydes are measured manually by the chromotropic acid, acetylacetone, and MBTH methods; and continuously by the light absorption method. Ozone and all oxides are measured manually by the iodimetric and phenolphthalein methods and continuously by the coulometric and light absorption methods. The thorium neotrine and lanthanum alizarine complex methods are used for manual measurements of fluorine compounds; fluorescent and light absorption methods are used for continuous measurement. The orthotolysin and light absorption methods are used, respectively, for manual and continuous analyses of chlorine. Respective manual and continuous methods of measuring hydrogen chloride are the thiocyanic acid-mercuric salt and electroconductivity method. The manual method for hydrogen cyanide is the pyridine-pyrazolone method. For manual measurements of hydrogen cyanide, the Indo-phenol and Nessler methods are employed.
APTIC-26122

STABLE ISOTOPES APPLIED TO POLLUTION STUDIES.

Am. Lab., no. 12:19-27, Dec. 1970. 10 refs.
(Presented at the Rocky Mountain Spectroscopy
Conference, 12th Annual, Denver, Colo., Aug. 3-
4,1970.)
Henry L. Dequasie, and Donald C. Grey.
Identifiers: *Mass spectrometry, *Isotopes, Feasibility studies, Carbon black, Construction materials, Wood, Petroleum refining, Primary metallurgical processing, Measurement methods, Sampling methods, Winds, Precipitation, Carbon dioxide, Sulfur compounds, Water.

If the isotopic ratios of a given element are known for the major sources of pollution, the measured isotope ratio of a mixed sample can be used to estimate the relative quantities of material emitted by the various sources. In the case of air sampling, wind conditions in the area being samples are an important consideration in determining the likely mixing of sources. Carbon and sulfur isotope studies in the Salt Lake City area are discussed as examples of the technique. Isotope ratio measurements are made with two CEC model 21-401 dual-collector mass spectrometers that have been modified to alternately measure samples and a standard. A detailed description of the sample collection and processing methods is given. Molecular sieves are used to trap and partially separate gaseous air pollutants. Water samples are passed through a column of ion-exchange resin that removes their sulfates. Samples are also taken from buildings by lightly scraping about 400 mg of surface sulfation into a vial. The carbon-13/carbon-12 ratios of tree-ring carbon are determined by mass spectrometry of carbon dioxide gas prepared from tree-ring wood. Samples taken in the vicinity of a copper ore smelter are discussed, as well as those taken in a refinery area of Salt Lake City. Water samples, precipitation samples, rock determinations, and wood measurements are also described.
APTIC-26123

THE TECHNIQUES OF MEASUREMENT IN THE OIL HEATING CONTROL OF THE CITY OF ZURICH AND THE WAY OF ITS APPLICATION.

Text in French. Preprint, International Union of
Air Pollution Prevention Associations, 11p., 1970.
16 refs. (Presented at the International, Clean Air
Congress, 2nd, Washington, D. C., Dec. 6-11,
1970, Paper AD-42E.)
W. Hess.
Identifiers: *Equipment criteria, *Zurich (switzerland), *Domestic heating, *Measurement methods, Enforcement procedures, City governments, Federal governments, Codes, Europe, Fuel oils.

It is estimated that domestic heating contributes 20-50% of all air pollution. In Switzerland, central heating with fuel oil is at present the most popular type of domestic heating. Use of solid fuels is on the decrease, while gas heating has shown only slight gains. Systematic inspections in the city of Zurich during the cold season of the years 1963-1970 show that 20-40% of the installations inspected had a soot index of more than 3, a result that agrees with studies made in Rhineland-Westphalia. In the area around the West German city of Essen, as many as 60% of the installations authorized exceeded the permissible soot index. In Zurich, the corresponding figure would be about 30%. The Swiss National Commission on Atmospheric Hygiene recently issued directives on the inspection of fuel oil heating equipment. A key statement of this commission on the measuring procedures to be used is analyzed phrase by phrase and is compared with parallel West German and American governmental actions. The main concern of the directive is the measurement of the soot and unburned hydrocarbons in the atmosphere, as determined from filter paper samples.
APTIC-26137

A TRACER TECHNIQUE TO MEASURE DEPOSITION OF STACK EMISSIONS.

Am. Ind. Hyg. Assoc. J., 21 (5):343-349, Oct. 1960.
7 refs. (Presented at the American Industrial
Hygiene Association, 21st Annual Meeting,
Rochester, April 27, 1960.)
E. J. Schulz, R. A. Duffee, R. I. Mitchell, and E.
W. Ungar.
Identifiers: *Stack gases, *Dissipation rates, *Tracers, Fly ash, Electric power production, Particle size, Cascade samplers, Membrane filters, Experimental methods, Atmospheric movements, Decomposition, Fluorescence, Thermodynamics, Temperature.

A liquid atomizing technique was selected to generate a tracer aerosol which has the same settling characteristics as those of the emitted material. The parameter having the greatest effect on the particle size of the resulting dried tracer is the concentration of the solution to be atomized; the particle size distribution of the tracer aerosols for this study was determined with a cascade impactor. Solutions of uranine absorb blue light between the wavelengths of 4400-5200 A and have a brilliant yellow fluorescence between 5100 and 5900 A. Emissions from 250- and 300-foot stacks at a power plant were used for this study, while observations of plume direction were also recorded. To accelerate the tracer tests, instead of utilizing impaction slides or dust-fall jars, samples of the emitted tracer were obtained at various locations in the sampling area by collection on 2-inch membrane filtes. Wind direction and velocity together with observations of plume direction are shown to aid in relating fly-ash concentrations obtained and the deposition rates calculated. Based on preliminary laboratory study to investigate uranine decomposition with temperature, it was found that uranine could be dispersed as a tracer at stack gas temperature up to 600 F without decomposition. It is mandatory that background fluorescence be determined in the area to be investigated, while with direct stack injection, losses of tracer in the stack must be determined for each application.
APTIC-26139

THE ABSOLUTE EFFICIENCY OF THE IMPINGER AND OF THE ELECTROSTATIC PRECIPITATOR IN THE SAMPLING OF AIR CONTAINING METALLIC LEAD FUME.

J. Ind. Hyg. Toxicol., 26 (7):241-249, Sept. 1944. 8 refs. (Presented at the American Industrial Hygiene Association, Annual Meeting, 5th, St. Louis, Mo., May 1944.)
Robert G. Keenan, and Lawrence T. Fairhall.
Identifiers: *Fumes, *Sampling methods, *Impingers, *Electrostatic precipitators, *Lead compounds, Glass fabrics, Voltage.

Investigation of various means of collecting oxide-free metallic lead fume has demonstrated the conditions which must be fulfilled for maximum efficiency of sampling. Means were devised for measurement of absolute efficiencies by direct comparison of the amounts of lead retained by a given sampling device with the total amount of lead drawn through the apparatus. An apparatus was devised for the formation of lead fume and the true metallic nature of the latter was shown by microchemical tests and by comparison of its X-ray diffraction pattern with that of pure lead. Microscopic measurements of the particle size of this fume were made. A collecting device for lead fume which depends upon surface contact with glass wool was devised and was found to be 100% efficient for collecting freshly formed lead fume. This device was used for the estimation of the absolute efficiency of both the impinger and the electrostatic precipitator. The efficiency of an AC electrostatic precipitator of the type described varies with the voltage imposed at lower voltages, but that at 25,000 volts it is fully efficient for metallic lead fume. An improved all-glass type of precipitator tube with sealed-in electrode was devised for air sampling. It presents certain advantages over the usual type of precipitator tube. The large impinger is efficient for aged lead fume at low rates but inefficient for fresh fume at these rates. The efficiency of the large impinger increases with rate of air flow and is nearly 100% efficient for the collection of freshly formed metallic lead fume at the highest rate of air flow and maximum negative pressure. Its efficiency is independent of the atmospheric concentration of lead. (Author summary modified)
APTIC-26145

ACOUSTIC METHODS FOR THE REMOTE PROBING OF THE LOWER ATMOSPHERE.

Proc. IEEE (Inst. Elec. Electron. Engrs.), 57 (4):571-578, April 1969. 27 refs.
C. Gordon Little.
Identifiers: *Acoustic sounding, *Lower atmosphere, Experimental methods, Mathematical analyses, Atmospheric movements, Humidity, Temperature (atmospheric), Scattering (atmospheric), Inversion, Turbulence (atmospheric), Refractive index.

The potential usefulness of acoustic methods for the remote probing of the lower atmosphere is reviewed. Starting with a comparison of the effects of temperature, wind, and humidity fluctuations upon the refractive index of air to electromagnetic and acoustic waves, it is shown that the fluctuations in acoustic refractive index may be expected to be about 1000 times stronger than in the radio case. The opportunities for passive and for line-of-sight remote acoustical sensing of the troposphere offered by this relatively strong interactions are briefly identified. Since the scattered power is proportional to the square of the refractive index fluctuations, the scatter of acoustic waves may be expected to be roughly one million times stronger than for radio waves. Based on the theoretical work of Kallistratova (but including the effects of atmospheric absorption), the system parameters required for effective acoustic echo-sounding of the lower atmosphere are deduced. It is concluded that the acoustic sounding technique could be developed to monitor, to heights of at least 1500 meters: the vertical profile of wind speed and direction, the vertical profile of humidity, the location and intensity of temperature inversions, the three-dimensional spectrum of mechanical turbulence, and the three-dimensional spectrum of temperature inhomogeneity. (Author abstract)
APTIC-26150

A COMPARISON OF METHODS FOR TESTING THE FASTNESS TO GAS FADING OF DYES ON ACETATE.

Am. Dyestuff Reptr., 45 (20):737-740, Sept. 24, 1956. 28 refs. (Also: Melliland Textilber., vol. 37:321-324, 1956.)
Paul Rabe, and R. Dietrich.
Identifiers: *Acetate, *Fading, *Measurement methods, *Nitrogen dioxide (no2), *Standards, Synthetic fibers, Germany, Gases.

The Technical Committee (TC 38) of the International Organization of Standardization (ISO) has proposed testing gas-fading fastness of dyes on acetate by means of nitrous gases developed from a burning gas flame. The German Fastness Commission (DEK), on the other hand, has suggested a test method making use of nitrous gases liberated by $NaNO_2$ solution from acetic acid. In the latter procedure, water, glacial acetic acid, and sodium nitrite are added to an evaporating dish over which a bell jar is placed. A slowly turning propeller provides for uniform distribution of the gases. The proposed methods are experimentally compared with respect to the amount of nitrogen dioxide formed. The gas was photometrically determined from the color of red azo dye formed in a solution of sulfanilic acid and alphanapthylamine. The DEK apparatus gave significantly higher values: an average of 37.0 mg NO_2 was formed in 30 min vs. only 1.4 mg NO_2 in the ISO apparatus. In addition, the DEK apparatus allowed testing at a constant relative humidity. This is important since fastness to gas fading is affected by relative humidity.
APTIC-26167

THE PRODUCTION OF TRANSPARENT PROFILES OF DUST PARTICLES AS AN AID TO AUTOMATIZED PARTICLE COUNTING.

Brit. J. Appl. Phys., vol. 7:186-188, May 1956. 7 refs.
R. J. Hamilton, and B. A. Phelps.
Identifiers: *Microscopy, *Dusts, *Particle counters, Great britain.

The technique of 'shadowing' by metal evaporation in a vacuum has been adapted to the production of plane 'negative' images of dust deposits on microscope slides at natural size by vacuum evaporation of metal at right angles to the slide, and subsequent removal of dust. The slide receives a precise impression of the geometric projections of the particles. The correspondence of image and object is exact. The thickness of the deposited films can be suited to the contrast requirements of an automatic particle counter; further, the film lies in one plane and is only a few hundred angstrom units thick. Many of the optical problems airing from the association of automatic counting techinques with high-power light microscopy, namely, depth of focus and variable contrast between particles and background and between different parts of single particles, are avoided by substituting the shadow for the original specimen. (Author abstract modified)
APTIC-26183

ORBITAL PHOTOS APPLIED TO THE ENVIRONMENT.

Photogrammetric Eng., 36 (8):852-864, Aug. 1970. 9 refs.
Frank J. Wobber.
Identifiers: *Orbital photography, Water pollution, Mapping, Photographic methods, Point sources, Meteorology, Topographic interactions.

Suborbital and earth-orbital photographs were assessed to evaluate the usefulness of orbital images for studies on environmental quality. The indications are that color and multispectral orbital photography can be valuable for locating comparable point sources of pollution in populated areas and analyzing dispersion patterns. With data derived from orbital photographs, it is possible to obtain a synopsis of regional air pollution distribution as influenced by the interrelation between topography and meteorology. Color and multispectral orbital photography also has a high value for determining sediment pollution and mapping lake and marine hydrodynamics. Orbital images cannot replace aerial photographs for collecting socio-economic data, although mutually supporting orbital-aerial data collection systems appear practical.
APTIC-26187

ANALYTICAL INSTRUMENTATION FOR MONITORING AIR AND WATER POLLUTION.

Annu. ISA Conf. Proc., vol. 17:6-1 to 6-4, 1967. 3 refs.
Edward L. Stockton.
Identifiers: *Instrumentation, *Air quality measurement programs, *Allegheny county, Pennsylvania, Urban areas, Suspended particulates, Analytical methods, Continuous monitoring, Winds, Humidity, Temperature (atmospheric), Sulfur dioxide, Hydrogen sulfide, Solar radiation.

The air monitoring Network in Allegheny County is being expanded to include a series of remote analyzing stations from which data will be telemetered to a central point. Eight parameters will be continuously monitored. They are sulfur dioxide, hydrogen sulfide, wind speed, wind direction, humidity, temperature, solar radiation, and suspended particulates. Simple, time-tested, telemetering equipment utilizing telephone transmission lines will be employed. Additional equipment to linearize recorded results for greater accuracy will also be included in the system. As funds permit, equipment will be purchased and installed to monitor continuously nitrogen compounds, lead, beryllium, and perhaps fluorides.
APTIC-26189

VOLUMETRIC DETERMINATION OF CONCENTRATIONS OF SULFURYL FLUORIDE IN AIR.

Anal. Chem., 35 (10):1476-1479, Sept. 1963. 4 refs.
Stanley G. Heuser.
Identifiers: *Sulfuryl fluoride, *Colorimetry, Great britain, Pesticides, Fluorides, Carbon dioxide, Sulfur compounds.

The reaction of the fumigant sulfuryl fluoride with alkalies is discussed, and two volumetric methods of determining its concentration in air are described. The first method involves titration of excess NaOH with 0.05N HCl, using thymolphthalein as indicator. The second method involves titration of excess barium hydroxide with 0.1N HCl, again with thymolphthalein as indicator. In the first method, the amount of carbon dioxide absorbed by the reagent has to be calculated by direct titration of excess alkali in another aliquot of the sample. In the second method, CO_2 present in the atmosphere is precipitated as barium carbonate together with the fluoride. If determination of CO_2 is not required, titration with HCl is replaced by direct addition of a standard amount of acid in excess to sample and reagent blank. The amount of SO_2F_2 present is then obtained directly by difference in titrations with 0.02N $Ba(OH)_2$. Recoveries of SO_2F_2 in normal air by both methods are tabulated, as are results obtained by the first method when 1.5 to 2.5% by volume CO_2 was present. Collectively these results show substantially correct recoveries of the two gases by either method, either individually or in admixture without mutual interference. However, the second method is preferred for accurate measurements of low concentrations of SO_2F_2, since the calculation is made independently from that for CO_2.
APTIC-26203

SPECTROCHEMICAL DETERMINATION OF FLUORINE IN PORCELAIN ENAMEL FRITS.

Anal. Chem., 30 (9):1130-1332, Aug. 1958. 8 refs.
Donald C. Spindler, and Mona Franck Smith.
Identifiers: *Porcelain enamel frits, *Spectrometry fluorine compounds, Glass, Surface coatings, Analytical methods, Spectrometry, Fluorine compounds.

Porcelain enamel frits, which are the basic material for porcelain enameling, are selected glasses of widely varying composition. These molten glasses are fritted by air or water quenching to form brittle flakes or granules. Fluorine may be added to a glass batch as an alkali silicofluoride or fluorspar. Fluoride aids in smelting the raw bath and increasing the opacity of zircon enamels. Fluorine losses occur during smelting as silicon tetrafluoride, boron trifluoride, and alkali fluorides. Rapid comparison of porcelain enamel frits is facilitated by spectrochemical determination of fluorine. Calcium carbonate and graphite are mixed with the sample to produce calcium fluoride bands. The intensities of the band head at 5291.00 A, corrected for background, are compared with those of chemically analyzed standards. The range of fluorine covered is from a few tenths to 6% in frits. Some factors considered are the emulsion, amperage, time of exposure, and band components. Various amounts and kinds of additives are evaluated. (Author abstract modified)
APTIC-26209

PARTICLE-SIZE SPECTROMETRY OF AEROSOLS BY LIGHT SCATTERING IN A LASER BEAM AND ITS APPLICATION TO AIR MONITORING AND FILTER TESTING.

International Atomic Energy Agency, Vienna (Austria), Symp. on Treatment and Control of Airborne Radioactive Wastes, New York City, 1968, p. 33-42. 7 refs. (Aug. 26-30.)
W. Jacobi.
Identifiers: *Particle size, *Lasers, *Spectrometry, Deposition, Germany, Aerosols, Monitoring, Filters, Design criteria, Light scattering.

The most important physical parameter for the characterization of an aerosol is its particle-size distribution; this concerns the behavior of aerosols in free air, their removal in filters, and the deposition of inhaled aerosols in the human respiratory tract. A new type of light-scattering aerosol spectrometer is described, which utilizes a helium-neon laser with a beam power of 0.5 mW at a wavelength of 6328 A. Each aerosol particle crossing the laser beam generates a pulse of scattered light whose length is given by the transit time of the particle through the beam and therefore depends only on the flow rate. The form of the scattered light pulse corresponds to the Gaussian intensity profile of the laser beam. As the diameter of the aerosol-containing air beam is small compared with the laser beam diameter, all aerosol particles traverse nearly the same intensity profile. The small size of the scattering volume permits the direct spectrometry of air with concentrations up to about 1000 particles/cu cm without dilution. No optical lenses are used, while the scattered light pulse is directly measured by a sensitive photomultiplier whose cathode is attached to one base of the cylindrical light conductor. An advantage of measuring the pulse area distribution of the output pulses from the multiplier is a reduction of the background noise and a higher signal to noise ratio. The spectrometer was calibrated with monodisperse latex aerosols of different particle diameters in the range of 0.3 to 3 micron.
APTIC-26214

AIR POLLUTION RESEARCH.

Photogrammetric Eng., 36 (8):840-848, Aug. 1970. 19 refs. (Presented at the ACSM/ASP Fall Convention, Portland, Ore., Sept. 1969.)
S. A. Veress.
Identifiers: *Photographic methods, *Plume behavior, Mapping, Diffusion models, Weather maps.

During several flying missions over Tacoma, Wash., photographs of a polluted air mass suitable for both quantitative and qualitative analysis were obtained with a Hasselblad 70-mm camera, equipped with polaroid filters or polaroid and blue filter combinations. With the filters the polluted air mass was detectable up to four to nine miles from its source and its dimensions (vertical and horizontal) measurable up to two to four miles from the source. Mapping from vertical and oblique photographs produced a contour map whose accuracy is acceptable for an air pollution survey. The map can be modified to show the yearly distribution of air pollution, including varying wind speed directions. A qualitative analysis of the photographs could result in a photogrammetric determination of the extinction coefficient from which the concentration of the pollutant can be obtained. A further application of photogrammetry to air pollution research could lie in the development of a mathematical model for annual distribution of pollutant concentration.
APTIC-26218

IMPROVEMENTS RELATING TO METHODS OF AND INSTRUMENTS FOR MEASURING THE CONCENTRATION OF COMBUSTIBLE GAS IN AN AIR SAMPLE.

(Assignee not given.) Brit. Pat. 1,151,240. 9p., May 7, 1969. (Appl. Dec. 3, 1966, 21 claims).
Rolf Huebner.
Identifiers: *Methanes, *Electrical resistance, *Potentiometric methods, Germany, Combustion gases, Measurement methods, Design criteria.

A method is described for measuring the concentration of a combustible gas in an air sample, with particular application to the determination of methane in an underground mine. The instrument comprises a measuring chamber, a pump adapted to draw a discrete sample of air and gas into the chamber preparatory to measurement, and an electrical measuring circuit. Two resistors are in the form of filaments which are coated with a catalyst and are designed to present a resistance such that they operate when energized at a temperature of the order of 700 C; the other two resistors are not coated with a catalyst and are of such dimensions as to operate when energized at a lower temperature, for example 650 C.
APTIC-26245

SOPHISTICATED SYSTEMS REQUIRED TO MONITOR HEAVIER POLLUTION.

Electronics Weekly (London), 22 (503):7, April 22, 1970.
J. E. Smith.
Identifiers: *Automatic methods, *Intermittent monitoring, *Pollutants, *Data handling systems, Great britain.

Current requirements for continuous air pollutant monitoring have created the need for sophisticated systems able to deal with the volume of data produced and to reduce and store data from many remote sensors at a central point. A general purpose system designed to meet the requirements and installed in many American Cities is described. The system has the ability to scan incoming data for pollutant concentrations in excess of a predetermined level and display them numerically with special systems, or ring alarm bells.
APTIC-26256

A 'PERSONAL' MEASURING INSTRUMENT FOR ATMOSPHERIC SULPHUR DIOXIDE.

Intern. J. Air Water Pollution (London), vol. 8:121-125, 1964. 1 ref.
T. Nash.
Identifiers: *Sulfur dioxide, *Electroconductivity analyzers, Great britain, Design criteria, Instrumentation, Hydrogen, Peroxides.

An instrument was developed for the measurement of sulfur dioxide concentrations within the range 0.1 to 5 ppm. It was built around an ordinary 500 ml polythene squeeze-bottle, which aspirates air into a small conductivity cell containing dilute hydrogen peroxide solution. The volume of solution is conveniently about 100 ml, which allows at least fifty readings to be taken. The instrument weighs about 1 kg complete with battery and solution. (Author abstract modified)
APTIC-26257

CELLULOSE SUPPORTED THORIUM-ALIZARIN RED S REAGENT FOR FLUORIDE ION DETERMINATION.

Anal. Chem., 30 (9):1485-1489, Sept. 1958. 14 refs.
Stanley K. Yasuda, and Jack L. Lambert.
Identifiers: *Fluorides, *Complex formation, *Colorimetry, Spectrophotometry, Ions, Reaction mechanisms.

The reagent and procedure described are the result of a study of colorimetric methods to produce color in solution directly proportional to fluoride ion concentration. Fluoride ion in concentrations to 15 ppm reacts selectively with the reagent to release the thorium-Alizarin Red S chelate (absorption maximum, 520 micrograms) into solution. Concentration limits for a number of possible common interfering ions were determined. A polymeric structure of the reagent and a mechanism for the ion exchange reaction are proposed. The combining ratio of thorium to dye was 1 to 2 by gravimetric and spectrophotometric methods. Chelation of thorium through a carbonyl oxygen and the 1-hydroxy group in the Alizarin Red S was substantiated by infrared absorption data. The method should be convenient for rapid visual or spectrophotometric determination of fluoride ion within the conditions specified. (Author abstract modified)
APTIC-26259

A PHOTOELECTRIC METHOD OF INVESTIGATING THE DISTRIBUTION OF PARTICLE SIZE OF PRECIPITATION.

Bull. Acad. Sci. USSR, Geophys. Ser. (English translation from Russian of: Izv. Akad. Nauk SSSR, Ser. Geofiz.), no. 1:120-125, 1957. 2 refs.
A. E. Mikirov.
Identifiers: *Precipitation, *Photometric methods, *Particle size, Ussr, Particulates, Droplets, Measurement methods, Altitude, Ground level, Lower atmosphere, Rain, Light scattering, Electric charge.

A photoelectric system was developed for measuring, at the earth's surface and from an air plane, the following physical characteristics of precipitation: particle concentration; size distribution; electric charge; and the overall quantity of water in a given volume of air. Construction of the instrument was based on the darkened field method and rational use of the index of drop dispersion to eliminate the effect of natural illumination. The aircraft variant of the instrument is described and illustrated. Spectra of drop distribution derived from airborne measurements of 3489 particles in different types of rain showers are shown. From data obtained with the system, the maximum number of drops contained in 1 cu m of air is calculated to be on the order of 1000 drops. No relationship could be established between particle sizes and their charges.
APTIC-26263

ANALYTICAL METHODS FOR DETERMINATION OF AEROSOLS BY MEANS OF MEMBRANE ULTRAFILTERS. VII. DIFFUSION AND IMPACTION PRECIPITATION OF AEROSOL PARTICLES BY MEMBRANE ULTRAFILTERS.

Collection Czech. Chem. Commun. (Prague), vol. 30:2276-2287, 1965. 24 refs. PART VI: Ibid., vol. 28, p. 2886, 1963.
K. Spurny, and J. Pich.
Identifiers: *Mathematical analyses, *Membrane filters, Czechoslovakia, Aerosols, Diffusion, Precipitation.

An equation was derived for the efficiency of precipitation of highly dispersed aerosols on a capillary model of membrane ultrafilter. Two mechanisms have so far been considered: precipitation by diffusion in capillary pores and precipitation by impaction on the filter surface. Characteristic curves have been computed and compared with experimental values. Total efficiency of a membrane ultrafilter is given by the sum of partial efficiences for impaction and diffusion minus their product. There has been a good qualitative agreement. (Author abstract modified)
APTIC-26266

COMBUSTION CHAMBER INVESTIGATIONS BY MEANS OF MICROWAVE RESONANCES.

IEEE (Inst. Elec. Electron. Engrs.) Trans. Ind. Electron. Control Instrum., 17 (2):60-66, April 1970. 10 refs.
A. L. Merlo.
Identifiers: *Microwave resonances, *Internal combustion engines, *Combustion, Computers, Recording methods.

Sensitive radio transmission techniques have not been applied to the study of combustion processes in internal combustion engines because of difficulties connected with the introduction of energy and interpretation of resonance signals. In a newly developed technique, chamber resonances are conveniently excited by microwave energy introduced through the spark plug insulator. Microwave absorptions of radiated energy occur as the piston moves up and down in the combustion chamber and are reflected back through the spark plug insulator. These absorptions provide information top dead center, rate of chemical ionization, direction and rate of instantaneous piston motion, ignition, and engine operating efficiency. The receiver employed for detecting reflected signals provides a visual display. Based on studies of the system in single cylinder, six cylinder, and V-8 engines, it is felt that monitoring the combustion cycle by means of the resonance signal will further progress in exhaust emissions and control.
APTIC-26268

TASKS AND PROBLEMS OF INDUSTRIAL TOXICOLOGY FROM THE VIEWPOINT OF TECHNICAL CHEMISTRY.

For primary bibliographic entry see Field 07.
APTIC-26274

POLLUTANT MEASUREMENT AND MONITORING INSTRUMENTATION TASK FORCE ASSESSMENT.

In: Project Clean Air. California Univ., Berkeley, Task Force 6, 170p., Sept. 1, 1970. 237 refs.
M. A. Chatigny, J. C. Craig, J. C. Edinger, G. Forester, and J. E. Gill.
Identifiers: *Instrumentation, Automotive emissions, Oxidants, Particulates, Electrochemical methods, Chromatography, Monitoring, Particle counters, Photometric methods, Smokemeters, Particle size, Gas sampling, Samplers, Electron microscopy, Lasers, Mass spectrometry, Diffusion, Aldehydes, Chlorine, Lead compounds, Mercury compounds, Hydrogen sulfide.

Instrumentation concepts and devices for the measurement and monitoring of air pollutants have been subdivided into three principle categories of application: ambient air and emission source monitoring for regulatory purposes and for control, vehicle emission monitoring and control, and research in pollution chemistry and laboratory analysis of pollutants. Currently available instruments are discussed, including oxidant analyzers, electrochemical analyzers, chromatography, spectroscopy, photoelectric devices, and particulate and gas samplers, while research needed is indicated. An instrument is needed for quantitative plume capacity measurements, to measure ambient air concentrations of hydrogen sulfide with a sensitivity and accuracy of 1-3 ppb over a range of 1-100 ppb, and a simple instrument is needed for measurements of the total aldehyde concentration, as well as lead, mercury, and chlorine. Improvements in the area of light and laser applications are also indicated. There is a need for rapid and valid verification methods for the proper functioning of present and future car emission control devices. Low-cost instruments and systems are needed in the study of urban diffusion processes. There is a need to devise ways for using the electron microscope. Various other projects are cited.
APTIC-26275

RESPECTIVE DETERMINATION OF NO AND NO2.

(NO, NO2 no bunbetsu teiryoho ni tsuite). Text in Japanese. Kuki Seijo (Clean Air-J. Japan Air Cleaning Assoc., Tokyo), 8 (6):1-7, Dec. 1970. 4 refs.
T. Sawaya, and Y. Sato.
Identifiers: *Colorimetry, *Nitric oxide (no), *Nitrogen dioxide (no2), Japan, Operating variables, Ions.

Nitric oxide and nitrogen dioxide, the two most problematic air pollutants, always coexist in the atmosphere. However, while both are present in large quantities in automotive engine exhaust, atmospheric concentrations of NO are higher than those of NO2. This may be because NO is more stable in air or because the photochemical decomposition of NO2 generates NO. The Saltzman method for the respective determination of NO and NO2 has the disadvantage that the acid potassium permanganate solution employed has a low oxidation efficiency for NO. The air oxidation method is inappropriate for the determination of low-density atmospheric NO and NO2. The new method reported is based on absorption of NO and NO2 by alkaline potassium permanganate and the respective quantitative determination of NO2 (-) and NO3 (-) in the absorbent solution. Respective NO and NO2 concentrations are then calculated from the ion measurements. The values obtained by be incorrect if measurements are made several days after absorption, if absorbent temperature is too high, or if the sample contains an oxidant. In these cases, both sodium hydroxide and alkaline permanganate solution should be used.
APTIC-26291

THE CASCADE CENTRIPETER FOR THE PARTICLE SIZE DETERMINATION AND ITS APPLICATION TO THE CHEMICAL ANALYSIS BY THE RING OVEN.

(Kasukedo sentoripita ni yoru fuyu funjin no ryukei bunpu sokutei narabini saishu shiryo no ringu obun ho ni yoru bunseki). Text in Japanese. Kuki Seijo (Clean Air-J. Japan Air Cleaning Assoc., Tokyo), 8 (6):20-28, Dec. 1970. 21 refs.
M. Kusumoto, and T. Toyama.
Identifiers: *Dusts, *Particle size, *Cascade samplers, Japan, Urban areas, Commercial areas, Industrial areas, Residential areas, Operating variables, Air quality measurements, Cobalt compounds, Manganese compounds, Ph.

The cascade centripeter for the collection of suspended dusts and their size determination is discussed with reference to construction, operation, and procedure for obtaining particle size distribution. To determine size distribution, corrected cutoff diameter values for each of the three stages of the sampler should be plotted for the axis of the abscissa on a probability chart. The corrected values can be expressed by either mass median diameter or effective cutoff diameter. When the sampler was tested in the field, the weight distribution of samples was consistently similar to logarithmic normal distribution. Two tendencies were apparent in concentration and particle size values obtained with the sampler. First, dust concentrations in large-scale industrial area fell between those in commercial and residential areas. Second, the majority of particles measured were one micron or less in diameter, the mass median diameter being greatest for particles collected in commercial or small-scale industrial areas. Microanalysis of the dusts showed that pH values were lowest, and manganese and cobalt values highest in small particles. These findings are considered to constitute data necessary for the effective control of particulate matter.
APTIC-26292

STUDIES IN THE PSYCHOLOGY OF OLFACTION (3). QUALITATIVE CLASSIFICATION OF ODOURS.

(Kyukaku ni kansuru gakusetsu (3). Text in Japanese. Akushu no Kenkyu (Odor Research J. Japan), 1 (3):1-9, Oct. 1970. 2 refs.
Masaaki Yoshida.
Identifiers: *Odorimetry, Japan, Odors, Statistical analyses.

Past and present studies in the psychology of olfaction are presented. System of classifying odors were developed by Aristotle, by specialists in the aromatics industry, by physiologists and psychologists, and, later, by food scientists. In 1946, Hsu applied multi-variable analysis to the result of a classification made by a panel. Yoshida applied the multiple dimension measurement method devised by Torgerson (1951) to the judgment made by a panel as to the similarity representative between 10-25 odors. Yoshida's study is objective, as is Hsu's, but it is difficult to name each factor. There is little consistency in the judgments made by laymen, while professionals in the aromatic industry have very high consistency among themselves (over 0.8), which indicates that the latter have established their own standards for classification, and also, developed a terminology for their guidance. The correlation between the direct approach, Crocker's classification, and the semantic differential method proves that each approach is reliable to a satisfactory extent. Similar multidimensional approaches were used by Engen, who applied Ekman's method, and Waskow, who had a panel judge the degree of similarity between stimulus i and stimulus j with 1-9 marks. By giving appropriate values to 1-9, the average was sought; this was made the 'distance', and the similarity of 25 odors was expressed qualitatively. The characteristics of the multi-dimensional approach is that by juding the degree of similarity or difference, without making the panel designate the degree of pleasantness, sweetness, etc., several basis for overall judgment on similarity or difference can be derived without the need of language.
APTIC-26309

4. AIR QUALITY MEASUREMENTS

REFERENCE BOOK SUMMARY OF NATIONWIDE EMISSIONS.

For primary bibliographic entry see Field 01.
APTIC-12496

REPORT FOR CONSULTATION ON THE METROPOLITAN PROVIDENCE INTERSTATE AIR QUALITY CONTROL REGION (RHODE ISLAND-MASSACHUSETTS).

For primary bibliographic entry see Field 12.
APTIC-12569

INTERSTATE EFFECTS SURVEILLANCE NETWORK. 1969 DATA.

NAPCA Pub. APTD 70-3, 203p., May 1970.
CFSTI PB 192446
Personal Author Not Recorded.
Identifiers: *Interstate effects surveillance network, *Air quality measurements, Air quality measurement programs, Corrosion, Discoloration, Metals, Steel, Lead, Zinc, Rubber, Cottons, Nylon, Non-urban areas, Commercial areas, Industrial areas, Residential areas, Particulates, Dusts, Dust fall, Soiling index, Lead peroxide candle, Silver compounds, Nitrogen oxides, Sulfur dioxide, Ozone.

The annual summary of raw data for 1969 from the Interstate Effects Surveillance Network is presented. A total of 274 stations report the measurements of metal corrosion, silver tarnishing, dustfall, nylon deterioration, rubber cracking, wind blown particulates, sulfur dioxide level, and the effects of nitrogen oxides, ozone, soiling, and sulfur dioxide on dyed fabrics. Some conversion factors are given, and a frequency distribution of the 1968 data is provided.
APTIC-22703

LITERATURE REVIEW OF METROPOLITAN AIR POLLUTANT CONCENTRATIONS—PREPARATION, SAMPLING AND ASSAY OF SYNTHETIC ATMOSPHERES. (FINAL REPORT).

For primary bibliographic entry see Field 03.
APTIC-22812

THE IMPORTANCE OF INVESTIGATING GLOBAL BACKGROUND POLLUTION.

In: Meteorological Aspects of Air Pollution. World Meteorological Organization, Geneva (Switzerland), Rept. WMO 251, TP139, TN106, p. 31-54, 1970. 9 refs.
Erik Eriksson.
Identifiers: *Air quality measurement programs, *Europe, Annual, Sweden, Chemical composition, Sampling methods, Precipitation, Ammonia, Chlorides, Calcium compounds, Magnesium compounds, Potassium compounds, Sodium compounds, Nitrates, Sulfates, Electrical properties, Ph.

In 1946, on the initiative of the Swedish Meteorological and Hydrological Institute and the Agricultural College of Sweden, a network of stations was organized for studying the chemical composition of precipitation; two years' investigations showed strong geographical variation in the concentrations of ammonia and nitrate in precipitation. After a few years this network was reduced in size but equipment for air sampling was added, so that both air and precipitation compositions could be studied. The analyses now comprised sodium, potassium, calcium, magnesium, ammonia, chloride, nitrate, sulfate, alkalinity, acidity, and electrical conductivity. Similar networks were organized in a number of countries in western Europe and in the U.S.A. A map of locations of stations in the west-European area that have been operated for at least nine years is presented. Equipment used in the west-European networks consists of a funnel of resistant glass, a storage bottle of polyethylene, and a bird protection device to prevent undue contamination. When fifteen graphs with the results of the data collected over a number of years were interpreted, no clear-cut trends in pollution concentration were revealed. Deviations from year to year are large, which is not unexpected in Western Europe, as this area is located on the border of a strong pollution source subjected to westerly circulation.
APTIC-23959

REGIONAL DIFFERENCES IN THE DEPOSITION OF HEAVY METALS OVER SCANDINAVIA.

(Regionala skillnader i nedfallet av tungmetaller oever Skandinavien). Text in Swedish. Lund Univ., Sweden, Inst. of Ecological Botany, Rept. 10, 23p., Feb. 1970. 7 refs.
Ake Ruhling, and Germund Tyler.
Identifiers: *Area surveys, *Scandinavia, *Dust fall, *Metal compounds, Plants (botany), Sweden, Air quality measurements, Transport, Rain, Cadmium compounds, Calcium compounds, Chromium compounds, Cobalt compounds, Copper compounds, Iron compounds, Lead compounds, Magnesium compounds, Manganese compounds, Nickel compounds, Potassium compounds, Sodium compounds, Zinc compounds.

The metal content in a common sort of moss is investigated, revealing an evident difference between southern Sweden and northern Scandinavia. A distinct increase in lead is observed in the southern regions of the study, indicating that lead must be transported from Western Europe by air. The greatest industrial sources of lead in Sweden are in the north. Concentrations of calcium, cadmium, cobalt, chromium, copper, iron, potassium, magnesium, manganese, sodium, nickel, lead, and zinc are measured. A distinct correlation between rainfall and metal concentration is observed.
APTIC-23971

THE NATIONAL AEROMETRIC DATA BANK.

Preprint, Air Pollution Control Association, Pittsburgh, Pa., 20p., 1970. 7 refs. (Presented at the Air Pollution Control Association Annual Meeting, 63rd, St. Louis, Mo., June 14-19, 1970.)
Gerald J. Nehls, Donald H. Fair, and John B. Clements.
Identifiers: *National aerometric data bank, Data handling systems.

The National Aerometric Data Bank channels valid aerometric data in both directions among Federal, state, and local agencies. The flow of data into and out of the Bank, including data preparation, validation, updating, processing, and retrieval operations, is handled by the Storage and Retrieval of Aerometric Data System (SAROAD). For incorporation in the Bank, data must (1) be representative of a consecutive three-month period, (2) an interval of one hour or greater (i.e., no more than 24 values per day), (3) characterize ambient levels in an area or neighborhood; and (4) be validated and in the same metric units as NAPCA's aerometric data. Presently, valid air quality data representing some 500 sampling sites are incorporated in the Bank. An intensified program is now underway to acquire all additional valid data on a nationwide basis and convert it to the SAROAD format for storage in the Bank. It is hoped that in the future all agencies will have the ability to accept as well as generate data in the SAROAD format. This capability is essential to Air Quality Control Regions. A brief discussion of SAROAD coding structures is given along with examples of input and output formats.
APTIC-24121

THE 1968 ANNUAL REPORT OF THE STATE INSTITUTE FOR IMMISSION AND SOIL PROTECTION OF THE STATE OF NORDRHEIN-WESTFALEN IN ESSEN.

For primary bibliographic entry see Field 12.
APTIC-24612

ONTARIO'S AIR POLLUTION INDEX.

Water Pollut. Contr., 108 (11): 55-58, Nov. 1970. 15 refs.
L. Shenfield, and F. Frantisak.
Identifiers: *Ontario, *Air quality measurement programs, *Particulates, *Sulfur dioxide, Alerts, Canada, Smog, Air quality measurements, Smog index, Continuous monitoring, Samplers, Haze.

Day-to-day pollution levels in Ontario are obtained by using an Air Pollution Index that provides a basis for action in an alert system to control or prevent an air pollution episode. Because photochemically produced smog is not as important in the province as the reducing type smog, the Index is based only on concentrations of sulfur dioxide and particulates. Sulfur dioxide is measured directly by continuous analyzers, with measurements telemetered from field stations to a central office. The present technique for measuring particulates involves the use of the Hemeon paper tape sampler and a high-volume sampler. The latter method provides concentrations in micrograms/cu m units; the data cannot be telemetered on a real time basis. The Hemeon paper tape sampler can be set to provide hourly readings which can be telemetered. Differences in transmittance of light through soiled and clean portions of the filter paper tape are converted into units of the coefficient of haze (COH). The 24-hr COH and sulfur dioxide levels set by Ontario regulations as objectives are 1.0 and .10 ppm, respectively. For these levels, an Air Pollution Index of 32 provides a range of indices twice as great for control action to take place than the range of acceptable levels, 0 to 32.
APTIC-24635

SOME EXAMPLES OF WIDE-AREA AIR POLLUTION IN LATE SPRING.

(Banshun ni okeru koiki taiki osenjirei no shokai). Text in Japanese. Taiki Osen Nyusu (Air Pollution News), no. 54:6-12, Sept. 1970.
Toshio Ohira, and Mituru Udagawa.
Identifiers: *Alerts, *Tokyo, *Sulfur dioxide, Hourly, Seasonal, Urban areas, Air quality measurements, Ground level, Lower atmosphere, Winds.

An air pollution alert was issued in Tokyo from May 9 to May 10, 1969 over a period of 29 hours. Meteorological maps, plots of hourly variation of sulfur dioxide gas concentration at different locations, and the hourly plots of the distribution of SO2 concentration and wind speed and direction are presented. For the two days, high concentrations of SO2 over 0.3 ppm were observed in only limited areas. It started with the southerly winds at altitudes of 125 and 225 m at Tokyo Tower, and eventually reached the ground level, although there was no high concentration at night under the same wind conditions. After its appearance at 125 and 225 m at Tokyo Tower, the concentration of SO2 rose in all 23 districts of Tokyo approximately within one hour. The data of 7 pm, May 10 at Jonan Public Health Service indicate that there is a possibility that high SO2 concentrations can be brought about by easterly winds.
APTIC-24685

MEASUREMENT OF ATMOSPHERIC FLUORINE. ANALYSES OF RAIN WATERS AND SPANISH MOSS EXPOSURES.

Ind. Eng. Chem., 44 (6):1365-1370, June 1952. 6 refs. (Presented at the American Chemical Society, Wilson Dam Section and the Southern Association of Science and Industry, Inc., Southwide Meeting, Wilson Dam, Ala., Oct. 18-20, 1951.)
W. H. MacIntire, L. J. Hardin, and Winnifred Hester.
Identifiers: *Plant indicators, *Air quality measurements, *Rain, *Fluorine compounds, Plants (botany), Industrial emission sources, Absorption, Point sources.

Rainfall collections at six points were analyzed to measure the periodic washdowns of fluorine from the atmosphere in relation to the locations of operations that emit fluoric effluents, and charges of Spanish moss were exposed to measure progressive intake of fluorine from the atmosphere. Longer intervals between rainfall caused higher concentrations of fluorine at the several locations. Proximities of samplings to sources of emissions were reflected by higher concentrations of fluorine in rain waters. Exposures of Spanish moss acquired substantial progressive enhancements in fluorine uptake at points near those where fluoric emissions occurred. The findings demonstrate that these two feasible and economical procedures can be implemented in parallel to establish whether a particular locale is subject to atmospheric pollution and the degree of pollution. Through integration with meteorological records, the determined occurrences of fluorine in the rain waters might indicate the origins of the contaminative effluents. (Author abstract)
APTIC-24717

FLUORIDE CONCENTRATIONS IN THE AMBIENT AIR.

Preprint, Air Pollution Control Association, New York City, 14p., 1970. 15 refs. (Presented at the Air Pollution Control Association, Annual Meeting, 63rd, St. Louis, Mo., June 14-18, 1970.)

Richard J. Thompson, Thomas B. McMullen, and George B. Morgan.
Identifiers: *Air quality measurements, *Fluorides, National air sampling network (nasn), Maximum allowable concentration, Annual, Colorado, Chicago, St louis, Cincinnati, Philadelphia, Washington d c, Non-urban areas, Urban areas, Commercial areas, Particulates, Suspended particulates, Analytical methods.

Data are reported for ambient atmospheric concentrations of water-soluble fluorides determined in samples of suspended particulate matter collected from rural and urban sites on glass-fiber filters by the National Air Surveillance Network. Data for over 12,000 samples collected in 1966, 1967, and 1968 are examined to give an estimation of current air quality with respect to fluoride content. Samples were extracted with pure boiling water and the fluoride concentration of the extracts measured using a fluoride-ion selective electrode. The data were tabulated on an annual basis; a table is presented summarizing the results, which show that the fluoride content in the majority of the samples is below the minimum detectable amount of 0.05 micrograms F/cu m. It is concluded that only in rare instances would the fluoride concentrations at the sites sampled be in excess of published standards, and that airborne fluoride does not prevail in the general environment at concentrations anywhere approaching the currently acknowledged thresholds endangering human safety. It is also noted, however, that the urban sites in this network represent center-city business environments, and that the findings do not refute results of special investigations near major sources of fluorides that clearly document excessive levels and adverse effects on vegetation and livestock. (Author abstract modified)
APTIC-24736

PROGRESS IN SMOG CONTROL AT LOS ANGELES.

In: California Legislature, Assembly Interim Committee on Air and Water Pollution, Final Summary Report. p. 77-83, 1950.
Gordon P. Larson.
Identifiers: *Control programs, *Los angeles, *Smog, Plant damage, Visibility, Samplers, Sulfur dioxide.

In the Los Angeles area from 1948 through 1950, visibility conditions are improving and smog is occurring less frequently. This holds true in a year when wind speeds have been lower than in previous years. Ordinarily low wind speeds would be expected to increase the frequency and intensity of smog. Information on sulfur dioxide trends is presented in the form of a chart of monthly average concentrations for 1949 and 1950 at all monitoring stations and of a graph of daily average concentrations for one station in October 1950 as compared to October 1949. Average monthly concentrations are lower in 1950, although slightly high measurements were recorded as the result of the lower wind speeds. The reductions are attributed to the measures taken to correct 7286 major and minor sources of pollution. Recent research activities of the Los Angeles Air Pollution Control District include the development of a visibility instrument and a continuous collection device for particulate matter and the reproduction of silver leaf-type crop damage with oxygenated hydrocarbons.
APTIC-24744

LEAD IN EXHAUST GASES.

(Bleihaltige Abgase). Text in German. Landarzt (Stuttgart), vol. 44:446-449, March 31, 1968.
Personal Author Not Recorded.
Identifiers: *Engine exhausts, *Lead compounds, Regulations, Maximum allowable concentration, Fuel standards, Germany, Fuel evaporation, Gasolines, Petroleum production, Automobiles, Air quality measurements.

The lead content of high octane gasolines sold in West Germany fluctuates from 0.13 g Pb/l to 0.510 g Pb/l depending on the composition of the oil distillates used and on the nature of the refining process. In 1965, 5000 tons of lead were emitted into the atmosphere of West Germany in exhaust gases which quantity is expected to increase twofold by 1975. The lead pollution level in German cities is between 1 to 4 micorgram Pb/cu m, in extreme cases 12 microgram Pb/ cu m air, which while not presenting an acute danger nevertheless may develop into one with time. The Russians who have detected genetic changes in the sperm of animals caused by lead have reduced the maximal permissible Pb pollution level to 0.7 microgram/ cu m air while in West Germany this level is 200 microgram/ cu m air largely because American oil research authorities still maintain that lead in the air presents no threat to public health. Large refineries possess adequate catalytic reforming facilities and cracking plants to produce high octane gas without the necessity of adding lead compounds to these gasolines. It is the medium sized and small plants which possess no refining facilities of their own who depend for the production of high octane gasoline on lead compounds. Refining adds little to the cost of high octane gasoline and prohibition of the addition of lead compounds to gasoline need not result in higher costs of gasoline.
APTIC-24757

PRINCIPAL AGENTS OF POLLUTION AND THEIR RATE OF DISPERSAL.

(I principali agenti inquinanti e loro rapporto di effusione). Text in Italian. In: L'Inquinamento atmosferico in Italia. Rept. 27, p. 43-47, 1970. 110 refs.
Luigi Mammarella.
Identifiers: *Carbon monoxide, *Sulfur dioxide, *Urban areas, *Air quality measurements, Italy, Combustion gases, Coal characteristics, Fuel oils, Vehicles, Dispersion.

The waste gases from the burning of coal have a sulfur dioxide content of 1-2%; fuel oil has a SO_2 content of 2-8% and more; automotive traffic gives off 0.5-1.0 kg of SO_2 per thousand liters of fuel. A table summarizes various maximum concentrations of carbon monoxide obtained from studies during the period 1955-1964 in the Italian cities of Milan, Turin, Genoa, Bologna, Florence, Rome, Naples, and Palermo.
APTIC-24776

THE SHARE OF AUTOMOBILE EXHAUST GASES IN AIR POLLUTION.

For primary bibliographic entry see Field 01.
APTIC-24783

AIR POLLUTION IN KAWASAKI.

(Kawasaki-shi ni okeru taiki osen). Text in Japanese. 55p., 1965.
Personal Author Not Recorded.
Identifiers: *Kawasaki, *Air quality measurements, Area surveys, Monthly, Seasonal, Japan, Dusts, Dust fall, Lead peroxide candle, Winds, Inversion, Sulfur dioxide.

Air pollution in Kawasaki was measured in 1965 by deposit gauges at eight locations and by lead peroxide method at ten locations. The annual average dust fall was tabulated for soluble and insoluble components and was graphed according to sectors. Dust fall is especially large in Taishi and Tajima areas. Seasonal variations of dust fall in relation to winds are tabulated and drawn as isoquants. The annual variation of dust fall is also presented. Monthly and seasonal variation of sulfur dioxides measured by the lead peroxide method are also tabulated and graphed. In summer there is extensive sulfur oxides pollution even in inland areas away from coastal industrial areas. The annual data show that sulfur oxides continue to be highly concentrated in Taishi and Tajima areas. The two automatic monitoring devices using an electroconductivity method show that for 1965, the sulfur oxides are of low concentration in spring and autumn. In Taishi, the summer peaks are due to seasonal winds and the winter peaks are due to inversions. A table of frequency of concentrations over 0.2 ppm recorded hourly is shown. Aside from the pollution data, wind direction data are also recorded.
APTIC-24789

MONITORING OF FLUORIDE CONTENT OF AIR, WATER, AND VEGETATION.

Air Pollution Control Assoc. J., 11 (2):66-70, Feb. 1961. (Presented at the Air Pollution Control Assoc. Annu. Meet., 53rd, Cincinnati, Ohio, May 22-26, 1960.)
Charles R. McHenry, and Hoyt Charles.
Identifiers: *Air quality measurement programs, *Florida, *Fertilizer manufacturing, *Fluorides, Operating variables, Air quality measurements.

The phosphate fertilizer industry is one of several industries that emits gaseous fluorides from certain manufacturing processes. There are nine major companies located in the Polk County, Fla. area engaged in the manufacture of various phosphate fertilizers. American Cyanamid Co. was one of the last companies in the area to build a triple superphosphate manufacturing plant. These types of plants emit gaseous fluorides in the forms of silicon fluoride and hydrogen fluoride as a byproduct. In order to reduce emission of gaseous fluoride to a minimum, certain control measures were incorporated in the blueprint specifications of the new processing plant. A five-year air pollution study was started in 1956 to measure the effectiveness of the built-in control devices. The study, still in progress, includes: continuous monitoring air and water sampling studies, vegetation surveys, and a meteorological monitoring program. Results of the study have been used to determine a fluoride emission rate for the plant that will be consistent with the air pollution laws of the state of Florida and the maintenance of desirable conditions around the plant site. Additional control equipment is presently being installed to accomplish this objective. To date, American Cyanamid Co. has spent 1.4 million dollars in the study to set plant operating standards and for pollution control equipment. The air pollution monitoring program has been an indispensable tool in defining the extent of the problem at Brewster and in determining necessary control measures for maximum production without air pollution. (Author summary modified)
APTIC-24801

NITROGEN DIOXIDE IMMISSIONS IN SOME SELECTED DISTRICTS OF THE STATE OF NORDRHEIN-WESTFALEN.

(Untersuchungen ueber Stickstoffdioxid-Immissionen in einigen ausgewaehlten Bezirken des Landes Nordrhein-Westfalen). Text in German. Landesanstalt fuer Immissions- und Bodennutzungsschutz des Landes Nordrhein-Westfalen Essen (West Germany), Rept. 14, p. 70-78, 1969. 23 refs.
H. Hartkamp, and H. Stratmann.
Identifiers: *Area surveys, *Nordrhein-westfalen, *Air quality measurements, *Nitrogen dioxide (no2), Air quality criteria, Standards, Germany, Industrial areas, Spectrophotometry.

The nitrogen dioxide concentrations of 15 selected circular areas each covering an area of 28 sq km located in the Ruhr basin of West Germany were determined by 9578 individual measurements using the Stratmann and Buck modified photometric test (conversion of NO_2 with sulfanilic acid to a diazonium cation and subsequent coupling with N-(1-naphthyl)-ethylene diamine to a red soluble azodye) and evaluated. Concentration level I was defined as an NO_2 pollution level with a low limit of 27 and a high limit of 65 microgram NO_2/cu m, concentration level II with a low limit of 74 microgram and a high limit of 174 microgram NO_2/ cu m. Both levels identifying NO_2 pollution in the various districts are far below the maximal permissible

concentration levels. In spite of the great topographical diversity of the areas under review, NO2 concentration levels differed so little that they could not be attributed to any specific source or group of sources.
APTIC-24807

RECOMMENDATIONS AND SUMMARY OF PARKERSBURG, W. VA.-MARIETTA, OHIO, INTERSTATE AIR POLLUTION ABATEMENT CONFERENCE.

For primary bibliographic entry see Field 12.
APTIC-24858

DETERMINATION OF DUST FALL WITH GLASS FILTER PANS.

For primary bibliographic entry see Field 03.
APTIC-24861

DETERMINATION OF SMALL AMOUNTS OF SULFURIC ACID IN THE ATMOSPHERE.

Anal. Chem., 22 (9):1181-1183, Sept. 1950. 9 refs.
Paul P. Mader, Walter J. Hamming, and Anthony Bellin.
Identifiers: *Sulfuric acid, *Los angeles, *Air quality measurements, Urban areas, Mists, Colorimetry, Filters, Fog, Humidity.

Small concentrations of sulfuric acid present in Los Angeles air were successfully determined by passing air samples through Whatman No. 4 filter paper that had been treated to remove its acidity and alkalinity. After sampling for one hour, the test filters were macerated in distilled water and the acidity of the resulting solution measured by titration with sodium hydroxide. The amounts of sulfuric acid found in typical Los Angeles air samples are tabulated. They are of the same order of magnitude as results obtained in London with glass sintered filters. In Los Angeles, sulfuric acid levels ranged from 0.0 on a clear, pollution-free day to 0.036 ppm in the presence of dense fog and intense air pollution. A high moisture saturation of the atmosphere appears to provide a highly satisfactory medium for the rapid oxidation of sulfur dioxide to sulfuric acid mist. After the temperature increased during the day and the fog particles dissipated, the sulfuric acid mist remained in the air because of its low vapor pressure. At a low relative humidity, sulfuric acid levels were very low or undetectable, even in the presence of relatively high sulfur dioxide concentrations.
APTIC-24874

THE HYGIENIC ASPECTS OF THE PRODUCTION AND USE OF LEAD ANTIKNOCK COMPOUNDS.

For primary bibliographic entry see Field 07.
APTIC-24876

MONITORING OF SO2 IN THE VICINITY OF COAL-FIRED POWER PLANTS--TVA EXPERIENCES.

Proc. Am. Power. Conf., vol. 27:117-123, 1965. 7 refs.
F. E. Gartrell.
Identifiers: *Sulfur dioxide, *Steam plants, *Air quality measurements, Stacks, Electrostatic precipitators, Ground level, Winds, Stability (atmospheric), Neutral condition.

During the last 15 years, TVA has conducted extensive air pollution studies at eight modern coal-fired, steam-electric generating stations. The plants vary in unit size, stack height, fuel supply, site topography, and micrometeorology. Significant findings regarding the effects of the number of stacks, electrostatic precipitators, and air stagnation conditions, plus stack performance and frequency distributions of sulfur dioxide concentrations, are reviewed and summarized in tabular or graphic form. It is noted that maxium SO2 concentrations can be expected for a 1-,2-,3-, or 4-stack plant, with various distances between the stacks and with combustion gases from 500 megawatts capacity being discharged from each stack. In contrast to urban areas, higher SO2 levels from TVA plants occur during moderate to high wind and neutral stability conditions. The trend for dispersion from 600-ft stacks is toward lower SO2 frequency at ground level. Use of electrostatic precipitators has reduced maximum ground level SO2 concentrations by about 25%.
APTIC-24913

EFFECT OF THE FEBRUARY 1959 FOGS ON THE POLYCYCLIC HYDROCARBON CONCENTRATION OF THE ATMOSPHERE OF THE LIEGE AREA.

(L'incidence des brouillards de fevrier 1959 sur la concentration en hydrocarbures polycycliques de l'atmosphere de la region liegeoise). Text in French. Arch. Belges Med. Sociale, Hyg., Med. Travail, Med. Legale (Brussels), 18 (3):220-227, March 1960. 9 refs.
D. Rondia.
Identifiers: *Air quality measurements, *Fog, *Polynuclear compounds, France, Valleys, Particle size, Membrane filters, Anthracenes, Fluoranthenes, Perylenes, Phenanthrenes, Benzopyrenes.

The amount of polycyclic hydrocarbons in the air of the Liege region is compared during normal winter weather and during a time of prolonged fog. A system for dust collection was installed. The first pump was situated outside the industrial region; the second in the middle of an industrial complex; the third at the top of a hill separating the industrial zone from the city of Liege; the fourth in the center of Liege; and the fifth, at Herstal, a community of workers' homes and small industry. The analyses were conducted on suspended matter collected on Whatman No. 1 filter paper; the diameter of the collected particles never exceeded 10 micron. The technique used for the determination of polycyclic hydrocarbons is described. Nine hydrocarbons (fluoranthene, 1,2-benzopyrene, pyrene, 3,4-benzopyrene, 1,12-benzoperylene, 1,2-benzanthracene, phenathrene, coronene, anthracene) were found; the amounts are presented for the months prior to the fog, for the month of February, and are compared to amounts in other cities. Results showed collection station 1 was situated in the least polluted zone; 2, and 3 in very polluted areas; and 4 and 5 in zones of moderate pollution. There was an increase in the amount of polycyclic hydrocarbons during the February fog. In Liege, this increase was from 4-6 times the normal level. The uniformity of the pollution during this time is noted. The amount of hydrocarbons was intensely manifest at the center of Liege and on the surrounding elevations, accountable for by the fact that the fog enclosed and retained the pollutants emitted in the valley. Observations seemed to indicate that certain hydrocarbons such as pyrene and 1,2-benzanthracene were rapidly destroyed and disappeared in part from the filters during the period of collection, a factor which should be considered when choosing a mode of collection.
APTIC-24923

INSTRUMENTATION AND ANALYTICAL TECHNIQUES FOR THE CONTINUOUS DETERMINATION OF AIR CONTAMINANTS.

For primary bibliographic entry see Field 03.
APTIC-24927

A STUDY OF ATMOSPHERIC POLLUTION.

Monthly Weather Rev., 70 (10): 225-234, Oct. 1942. 1 ref.
W. F. Davidson.
Identifiers: *Stack gases, *Dusts, *Electric power production, *Air quality measurements, Seasonal, Urban areas, Fuels, Smoke shade, Owens jet dust counters, Data-handling systems, Recording methods, Winds, Humidity, Temperature (atmospheric).

A survey was undertaken in an effort to determine the extent to which dust emitted from the chimneys of power houses and gas manufacturing plants within the New York area contributed to the general atmospheric pollution of the city. Measurements of dust concentration were determined primarily by the measurement of shade number in the modified Owens recorder, although provision was made for converting the observations to weight loading such as tons per cubic mile. Selection of the meteorological data to be used in the survey was restricted to the obvious factors of wind velocity, wind direction, temperature in the shade, and humidity. After removal from the sampling machine, the records were examined, checked, and marked for identification and then assembled into strips filling a 400-foot 16-mm motion picture film reel. Tabulation is discussed, as well as the enormous difficulties in the way of interpreting the data. There is a clearly indicated relation that the shade number varies inversely as the square root of the wind velocity. Charts plotting shade number and meteorological data are included, with a discussion of their use. An almost startling feature is that from midnight until 3 in the afternoon and again from 9 in the evening until midnight, the winter and summer loads of the electric utility generating stations do not differ by a factor of more than 1.5. On the other hand, during these same hours, the shade numbers differ by a factor of from 1.5 to 2.1. Temperature did not have as great an influence on atmospheric dust concentration as wind velocity, but a seasonal variation of atmospheric dust concentration corresponded with variations in fuel use for heating. Various aspects of the dust measurement problem are discussed.
APTIC-24945

LEAD IN A SUBURBAN ENVIRONMENT.

J. Air Pollution Control Assoc., 19 (8):591-594, Aug. 1969. 14 refs.
P. R. Atkins.
Identifiers: *Air quality measurements, *Lead compounds, Highways, Residential areas, Engine exhausts, Vehicles, Particle size, Sedimentation, Rain, Turbulence (atmospheric), Nucleation, Particle growth.

The lead content of air, rainfall, and dry fallout samples taken at three sites in Palo Alto are reported and discussed. Airborne lead concentrations as high as 10 micrograms/cu m were observed near an expressway during periods of peak traffic flow. The concentrations appear to be related to traffic density and atmospheric turbulence. During morning hours, when turbulence was at a minimum, lead concentrations were nearly proportional to traffic flow; in the afternoon, when mixing increased, the concentrations were considerably reduced. The dry fallout data indicate that a large amount of lead is removed from the atmosphere by sedimentation and suggest that nucleation on submicron lead particles in exhaust streams can produce droplets that impact on larger particles. The rainfall samples contained lead pollutants from 1.0 mg/l to less than 0.004 mg/l. The lead appears to have entered the rainfall by scavenging near the surface where the airborne lead concentrations varied widely. Since scavenging is inefficient for particles less than one micron, the removal of lead by rainfall further indicates that some lead particles become attached to larger particles.
APTIC-24952

BENZPYRENE CONTENT OF DUST SAMPLES COLLECTED ON URBAN AND RURAL SETTLEMENTS AND IN INDUSTRIAL PLANTS 3,4.

(Varosi es falusi telepuleseken, valamint ipari uzemekben gyujtot pormintak 3,4-benzpyren tartalma). Text in Hungarian. Egeszsegtudomany, 14 (2):105-115, Feb. 1970. 7 refs.
Magdolna Kerteszne Saringer, and Jozsef Morik.
Identifiers: *Non-urban areas, *Industrial areas, *Air quality measurements, *Benzo (3-4)pyrene, Carcinogens, Aluminum, Europe, Highways,

Urban areas, Dusts, Metal fabricating and finishing, Internal combustion engines, Automobiles, Buses.

Dust samples were collected from several places in Budapest, from roads of eleven rural settlements and from 15 industrial plants. The highest 3,4-benzpyrene concentrations were found in some industrial plants, particularly in aluminum foundries (17.70 microg per g dust) and in bus garages (8.13 microg per g dust). High concentrations of 3,4-benzpyrene occur in the dusts of the main thoroughfares of Budapest. In some industrial plants and in the majority of the rural settlements, the contamination was very low or even no benz-pyrene could be detected in the sedimenting dust. This is the first study of carcinogenic substances in the atmosphere carried out on a larger scale in Hungary.
APTIC-25565

PROTECTION OF ENVIRONMENT.

(Nachbarschutz). Text in German. Rheinisch-Westfaelischer Technischer Ueberwachungsverein e. V. Jahresbericht, 1969:57-66. 16 refs.
T. Gilbert.
Identifiers: *Air quality measurement programs, *State governments, *Germany, *Air quality measurements, Regulations, Air quality standards, Emission standards, Equipment standards, Automotive emissions, Dusts, Boilers, Industrial emission sources, Incineration, Solid waste disposal, Internal combustion engines, Diesel engines, Process modification, Data analysis, Ammonia, Chlorine, Fluorine, Hydrocarbons, Carbon monoxide, Nitrogen oxides, Sulfur dioxide, Hydrogen sulfide.

Methods and results of several hundred ambient concentration and emission determinations of sulfur dioxide, fluorine, chlorine, ammonia, carbon monoxide, hydrogen sulfide, nitrogen oxides and of hydrocarbons emitted by a variety of industrial enterprises and shops undertaken in 1969 in the State of Nordrhein-Westfalen are tabulated and analyzed as are 469 expert opinions concerning pollution rendered as part of a certification procedure of new enterprises from all industrial fields. Procedural and instrumental changes designed to improve on present practices as they result from the analysis are proposed. These involve emission measurement of boiler plants, dust emission by large boiler furnaces, the operation of refuse incinerators, the supervision of steam and hot water boiler plants, exhaust gases from combustion engines and errors in pollution measuring instruments (Diesel-engine smoke). Noise pollution measurements issuing from 65 different sources undertaken during 1969 are tabulated and recommendations designed to reduce the noise level are submitted. Decrees, norms and guidelines concerning pollution promulgated during 1969 in the state of Nordrhein-Westfalen are listed.
APTIC-25593

LEADED PARTICLES IN URBAN AREAS.

J. Rech. Atmospheriques, no. 6:457-462, Oct.-Dec. 1966. 5 refs.
Ottavio Vittoria, and P. Mandrioli.
Identifiers: *Lead compounds, *Air quality measurements, *Bologna, Seasonal, Italy, Urban areas, Engine exhausts, Particulates, Vehicles, Colorimetry, Membrane filters, Condensation (atmospheric), Humidity, Temperature (atmospheric), Water.

Particulate matter in several localities in Bologna was collected on Millipore filters and analyzed for lead by the colorimetric Dithizone method. Results are presented for the lead content of winter and summer air samples taken in the immediate vicinity of a small square characterized by dense daytime traffic. They show no adverse lead levels resulting from the large amount of exhaust gas released in the area. Moreover, lead concentrations were not markedly affected by conditions of atmospheric stability prevailing during some winter sampling periods. Microchemical analysis of particles showed that, at high humidities and low temperatures, large leaded water droplets are produced by the condensation of water in exhaust. Thus a powerful mechanism for removing lead particles exists in such meteorological conditions.
APTIC-25635

STATISTICAL REPORT OF AEROALLERGENS (POLLENS AND MOLDS) FORT HUACHUCA, ARIZONA 1969.

Weather Bureau, Salt Lake City, Utah, ESSA WBTM WR 50, 4p., April 1970. CFSTI: PB 191743
Wayne S. Johnson.
Identifiers: *Fort huachuca, *Fungi, *Pollens, *Air quality measurements, Monthly, Allergies, Arizona, Spores.

Tabulations of aeroallergens are presented, based on standard sampling and counting procedures of the Pollen and Mold Committee of the American Academy of Allergy, for the calendar year 1969. One by three-in. glass microscopic slides were exposed for 24 hrs in the Durham Gravity Collector. The air-borne pollen grains and mold spores were identified and counted daily. Counts represent the number of pollens and spores collected per square centimeter of slide area during the 24-hour exposure. Species were identified where possible; otherwise identification was by genus. The figures shown in the tabulations are the accumulations of the daily counts for the month. The onset, duration, and termination of the pollintation period by weekly intervals are denoted. Molds were counted concurrently from the same slides as the pollens but are listed separately for convenience. (Author introduction modified)
APTIC-25679

POLYNUCLEAR AROMATIC HYDROCARBON COMPOSITION OF THE ATMOSPHERE IN SOME LARGE AMERICAN CITIES.

Am. Ind. Hyg. Assoc. J., vol. 23:137-144, March-April 1962. 27 refs. (Presented at the American Chemical Society, Air Pollution Seminar, Chicago, Ill., Sept. 1961.)
Eugene Sawicki, Thomas R. Hauser, Walter C. Elbert, Frank T Fox, and James E. Meeker.
Identifiers: *Urban areas, *Air quality measurements, *Polynuclear compounds, Seasonal, Smoking, Automotive emissions, Combustion gases, Coal, Gasolines, Diesel engines, Automobiles, Aromatic fractions, Column chromatography, Sampling methods, Hi-vol samplers, Spectrometry, Anthracenes, Chrysenes, Fluoranthenes, Fluorenes, Perylenes, Benzo (3-4)pyrene, Carbazoles, Thiophene.

The air of 14 American cities was examined for the following polycyclic hydrocarbons: pyrene, benzo (a)pyrene, benzo (e)pyrene, benzo (k)fluoranthene, perylene, benzo (g,h,i)perylene, anthanthrene, and coronene. Fluoranthene, chrysene, and benz (a)anthracene were present in most samples, while dibenzofuran, the benzofluorenes, dibenzothiophene, and carbazole were found occasionally. Airborne particulates were collected on flash-fired, glass fiber filters by means of a high-volume sampler. For organic analysis, the filter was extracted with redistilled benzene in a Soxhlet extractor for eight hours, and the organic material was then separated into about 30 fractions by column chromatography. The principal polynuclear hydrocarbons found in airborne particulates were characterized by ultraviolet and visible absorption bands. In all urban samples, the concentration of the polycyclic aromatic hydrocarbons was generally greater in winter than in summer. The ratios of benzo (a)pyrene to benzo (g,h,i)perylene and to coronene are introduced as possible indicators of air pollution due to automobile exhaust fumes or coal combustion pollution. A fairly complete list of polycyclic compounds that have been identified in air, tobacco smoke, and gasoline or diesel exhaust is presented. (Author abstract modified)
APTIC-25693

GAMMA RAY SPECTROMETRY OF THE NATURAL RADIOACTIVITY IN THE AIRBORNE DUST.

J. Radiat. Res., 10 (2):78-82, June 1969. 2 refs.
Iwashiro Oki, and Sachiko Tamura.
Identifiers: *Dusts, *Air quality measurements, *Gamma radiation, Diurnal, Japan, Spectrometry, Bismuth compounds, Lead compounds, Isotopes.

By means of gamma ray spectrometry, a qualitative variation in the diurnal variation of the natural radioactivity in the airborne dust was observed. The radioactive decay rate of the total natural radioactivity in the airborne dust collected during the day was higher than that collected during the night. The ratio of radioactive lead (Th B) gamma activity to the total gamma activity was higher in the night and lower in the day; on the other hand, the ratios of radioactive lead (Ra B) and radioactive bismuth (Ra C) were a little higher in the day than in the night. From the observation, it was concluded that the quantitative diurnal variation of the natural radioactivity in the airborne dust was associated also with the qualitative variation derived from the variation in the abundance ratio of nuclide. (Author abstract modified)
APTIC-25758

THE AIR OF ANCHORAGE–TODAY AND TOMORROW.

Alaska Med., 8 (1):8p., March 1966. 16 refs.
John L. S. Hickey.
Identifiers: *Anchorage, *Air quality measurements, Seasonal, Alaska, Volcanoes, Automotive emissions, Particulates, Industrial emission sources, Electric power production, Domestic heating, Open burning, Fog, Ice.

Air sampling results obtained in Anchorage since 1953 are discussed, particularly in relation to possible corrective measures, while present knowledge obtained in other areas and how it might be applied for prevention of future pollution in this area are also considered. High particulate loadings were recorded for several months after the volcanic eruption of Mount Spurr, in July 1953, with a fairly rapid reduction in ash and fallout in the following years. Summer dust-suppressing measures and street paving are recommended. The slight seasonal difference in organic particulates indicates that the bulk of the organic load may be due to year-round activities (industry, power generation, automobiles, incineration) rather than to heating. Pollution from vehicle exhausts may become a problem in Anchorage sooner than it might in a city of comparable size in a warmer climate because of the widespread practice of leaving engines idling during long periods in the winter. Use of electricity and gas in domestic and commercial heating systems causes much less air pollution than use of oil or coal. Control of open burning is recommended. Regardless of the degree to which Anchorage experiences ice fog, it is clear that its formation requires not only a low temperature but water vapor in the air and particulate nuclei. Particulate matter and pollutants in the air are presented tabularly.
APTIC-25770

PARKERSBURG, WEST VIRGINIA--MARIETTA, OHIO, AIR POLLUTION ABATEMENT ACTIVITY: SUPPLEMENTAL TECHNICAL REPORT.

NAPCA Pub. APTD 69-50, 71p., Sept. 1969. 31 refs. NTIS: PB 195144
Personal Author Not Recorded.
Identifiers: *Area surveys, *Proposals, *Ohio, *West virginia, *Emission inventories, Monthly, Plant damage, Respiratory system, Lachrymation, Odors, Particulates, Chemical processing, Electric power production, Solid waste disposal, Diffusion, Transport, Sulfur dioxide.

To supplement and update a 1967 technical report on air abatement activity in the Parkersburg, West Virginia - Marietta, Ohio area, a number of field investigations were initiated in January 1969 and continued through August 1969. The activities in-

cluded additional measurements of sulfur dioxide pollution through saturation sampling using sulfation plate measurements and aerial sampling from light aircraft. Data developed by these tests were used to determine the spread of sulfur dioxide over the area and the transport and diffusion of sulfur dioxide emissions from large sources. Source categories surveyed in 1966 were re-examined to determine whether significant changes had occurred in type and quantity of pollutant emissions in the two-year period since the initial survey. The general condition of vegetation in the area, particularly in the vicinity of major pollutant sources, was surveyed to determine the extent of injury from air pollution and possible changes in types of injury and areas affected since 1967. An odor and irritant survey was performed to obtain evidence of odors and sensory irritants causing lachrymation or nasal and throat discomfort. The results of the survey efforts are reported, and recommendations made with regard to control of process and steam-generating-plant emissions and refuse disposal.
APTIC-25780

AIR POLLUTION LEVELS ASSOCIATED WITH A 49-HR INVERSION AT DETROIT-WINDSOR.

Bull. Am. Meteorol. Soc., 41 (5):245-249, May 1960. 6 refs.
R. E. Munn.
Identifiers: *Detroit, *Air quality measurements, *Inversion, Canada, Atmospheric movements, Temperature (atmospheric), Weather maps, Lapse condition, Topographic interactions.

An account is provided of an inversion which was present over the Detroit-Windsor area from December 27th to the afternoon of the 29th in 1958. At the synoptic level, there were light southeast gradient winds and considerable fog associated with a ridge of high pressure. A contributing factor was the time of year, December, when incoming solar insolation is at a minimum. The inversion finally ended with the passage of a cold front from the northwest. Air-pollution levels gradually climbed during the two-day period, reaching a peak at the frontal passage. The events of the morning of December 29th provide an interesting study in mesometeorology. At the WJBK television tower, there was a temperature drop of 11 F at 300 ft with no change at 20 or 600 ft. At the Lagoona Beach meteorological tower, the lapse rate actually became superadiabatic for a short time, reverting to inversion conditions about noon. Winds were light northwest in contrast to the prevailing southeasterly gradient. The effect was also reflected in a brief but noticeable reduction in pollution levels. It is believed that the events are connected in some way, although no very satisfactory hypothesis is offered. The conclusion is reached that, for town planning for severe smog, gradient-wind directions from synoptic maps cannot be used with assurance. Even over level terrain such as there is at Detroit, mesoscale effects can assume great importance in determining the drift of pollution across the city. (Author conclusions)
APTIC-25784

CARBON MONOXIDE IN TOWN AIR: AN INTERIM REPORT.

Ann. Occupational Hyg., vol. 5:241-248, 1962. 6 refs.
P. J. Lawther, B. T. Commins, and Maureen Henderson.
Identifiers: *London, *Streets, *Air quality measurements, *Carbon monoxide, Maximum allowable concentration, Great britain, Urban areas, Automotive emissions, Stability (atmospheric).

During September 1958 and between October 1961 and February 1962, continuous analyses were made of carbon monoxide concentrations in the air of busy London streets. The results show that in periods of heavy traffic and calm weather the concentrations found in streets are higher than the usually accepted industrial maximum allowable concentration of 100 ppm. This suggests the need to examine blood CO levels in motorists and the effects of the gas on driving performance and health.
APTIC-25799

CONTINUOUS AIR MONITORING PROJECTS: 1968 DATA TABULATIONS AND SUMMARIES, CHICAGO.

NAPCA Pub. APTD 69-15, 109p., Dec. 1969.
NTIS: PB 194767
Personal Author Not Recorded.
Identifiers: *Continuous air monitoring program (camp), *Chicago, *Air quality measurements, Annual, Diurnal, Hourly, Monthly, Seasonal, Colorado, St louis, Cincinnati, Philadelphia, Washington d c, Urban areas, Oxidants, Soiling index, Continuous monitoring, Hydrocarbons, Carbon monoxide, Nitric oxide (no), Sulfur dioxide, Nitrogen dioxide (no2).

Hourly average concentrations of six gaseous pollutants (carbon monoxide, nitric oxide, nitrogen dioxide, sulfur dioxide, total hydrocarbons, and total oxidants), and 2-hour measurements of soiling index levels are tabulated for Chicago. A brief summary of monthly means and maximums and graphs of seasonal diurnal patterns of gaseous pollutants are included. Annual frequency distributions of the data pertaining to gases and soiling index are tabulated for Chicago, and for Cincinnati, Denver, Philadelphia, St. Louis and Washington, D. C. (Author abstract modified)
APTIC-25803

CONTINUOUS AIR MONITORING PROJECTS: 1968 DATA TABULATIONS AND SUMMARIES, PHILADELPHIA.

NAPCA Pub. APTD 69-18, 109p., Dec. 1969.
NTIS: PB 194761
Personal Author Not Recorded.
Identifiers: *Continuous air monitoring program (camp), *Philadelphia, *Air quality measurements, Annual, Diurnal, Hourly, Monthly, Seasonal, Colorado, Chicago, St louis, Cincinnati, Washington d c, Urban areas, Oxidants, Soiling index, Continuous monitoring, Carbon monoxide, Sulfur dioxide, Hydrocarbons, Nitric oxide (no), Nitrogen dioxide (no2).

Hourly average concentrations of six gaseous pollutants (carbon monoxide, nitric oxide, nitrogen dioxide, sulfur dioxide, total hydrocarbons, and total oxidants), and 2-hour measurements of soiling index level are tabulated for Philadelphia. A brief summary of monthly means and maximums and graphs of seasonal diurnal patterns of gaseous pollutants are included. Annual frequency distributions of the data pertaining to gases and soiling index are tabulated for Philadelphia, and for Chicago, Cincinnati, Denver, St. Louis, and Washington, D. C. (Author abtract modified)
APTIC-25804

CONTINUOUS AIR MONITORING PROJECTS: 1967 DATA TABULATIONS AND SUMMARIES, DENVER.

NAPCA Pub. APTD 69-8, 115p., April 1969.
NTIS: PB 194802
Personal Author Not Recorded.
Identifiers: *Continuous air monitoring program (camp), *Denver, *Air quality measurments, Continuous air monitoring programs (camp), Annual, Diurnal, Hourly, Monthly, Seasonal, Colorado, Chicago, St louis, Cincinnati, Philadelphia, Washington d c, Urban areas, Oxidants, Air quality measurements, Soiling index, Continuous monitoring, Hydrocarbons, Carbon monoxide, Nitric oxide (no), Nitrogen dioxide (no2), Sulfur dioxide.

Hourly average concentrations of six gaseous pollutants (carbon monoxide, nitric oxide, nitrogen dioxide, sulfur dioxide, total hydrocarbons, and total oxidants), and 2-hour measurements of soiling index levels are tabulated for Denver. A brief summary of monthly means and maximums and graphs of seasonal diurnal patterns of gaseous pollutants are included. Annual frequency distributions of the data pertaining to gases and soiling index are presented for Denver, and for Chicago, Cincinnati, Philadelphia, St. Louis, and Washington, D. C. (Author abstract modified)
APTIC-25805

REGARDING THE EFFECT OF PHYSICOGEORGRAPHIC CONDITIONS ON THE CONCENTRATION OF INDUSTRIAL EMISSIONS INTO THE ATMOSPHERE.

For primary bibliographic entry see Field 05.
APTIC-25813

CONTINUES AIR MONITORING PROJECTS: 1968 DATA TABULATIONS AND SUMMARIES, CINCINNATI.

NAPCA Pub. APTD-69-16, 103p., Dec. 1969.
NTIS: PB 194768
Personal Author Not Recorded.
Identifiers: *Continuous air monitoring program (camp), *Cincinnati, *Air quality measurements, Annual, Diurnal, Hourly, Seasonal, Colorado, Chicago, St louis, Philadelphia, Washington d c, Oxidants, Soiling index, Continuous monitoring, Hydrocarbons, Carbon monoxide, Nitric oxide (no), Nitrogen dioxide (no2), Sulfur dioxide.

Graphs are presented showing the seasonal diurnal patterns in Cincinnati for carbon monoxide, nitric oxide, nitrogen dioxide, sulfur dioxide, total hydrocarbons, and total oxidants. Hourly average concentrations by month are presented, while soiling index values were also obtained. Annual frequency distributions of the data pertaining to gases and soiling index are presented for the six Continuous Air Monitoring Program stations in Chicago, Cincinnati, Denver, Philadephia, St. Louis, and Washington, D.C.
APTIC-25817

CONTINUOUS AIR MONITORING PROJECTS: 1968 DATA TABULATIONS AND SUMMARIES, WASHINGTON, D. C.

NAPCA Pub. APTD 69-20, 103p., Dec. 1969.
NTIS: PB 194763
Personal Author Not Recorded.
Identifiers: *Continuous air monitoring program (camp), *Washington, *D. c., *Air quality measurements, Annual, Diurnal, Hourly, Seasonal, Colorado, Chicago, St louis, Cincinnati, Philadelphia, Washington d c, Oxidants, Soiling index, Continuous monitoring, Hydrocarbons, Carbon monoxide, Nitric oxide (no), Nitrogen dioxide (no2), Sulfur dioxide.

Graphs are presented showing the seasonal diurnal patterns in Washington, D. C. for carbon monoxide, nitric oxide, nitrogen dioxide, sulfur dioxide, total hydrocarbons, and total oxidants. Hourly average concentrations by month are presented, while soiling index values were also obtained. Annual frequency distributions of the data pertaining to gases and soiling index are presented for the six Continuous Air Monitoring Program stations in Chicago, Cincinnati, Denver, Philadelphia, St. Louis, and Washington, D. C.
APTIC-25818

ATMOSPHERIC REACTION STUDIES IN THE LOS ANGELES BASIN. VOLUME I. PROGRAM DESIGN AND METHODOLOGY DATA SUMMARY AND DISCUSSION. 1969. (FINAL REPORT).

NAPCA Contract CPA 70-6, APRAC Proj. CAPA 7-68, Scott Proj. 1142, 113p., Feb. 16, 1970. 2 refs.
NTIS: PB 194061
Personal Author Not Recorded.
Identifiers: *Air quality measurements, *Research methodologies, Mobile, Los angeles, Oxidants, Smog, Monitoring, Continuous monitoring, Ground level, Lower atmosphere, Winds, Humidity, Temperature (atmospheric), Inversion, Temperature gradient, Aldehydes, Aliphatic hydrocar-

bons, Peroxyacetyl nitrate, Carbon monoxide, Nitric oxide (no), Nitrogen dioxide (no2), Ozone, Ultraviolet radiation.

A comprehensive survey of the atmosphere of the Los Angeles Basin was conducted during the period August 18 to November 14, 1969. A large number of contaminants were determined continuously and periodically, and readings of pertinent meteorological factors were made at two ground level sites and in vertical profiles above the ground sites. Two mobile trailer-type laboratories were used in the study. Each contained instrumentation for continuous monitoring of a number of contaminants, photochemical products and meteorological parameters and chromatographs and wet chemical apparatus for determining a large number of additional pollutants periodically. The pollutants measured included carbon monoxide, oxidant, ozone, nitric oxide, nitrogen dioxide, total hydrocarbons, individual hydrocarbons, peroxyacetyl nitrate, and total aliphatic aldehydes. The meteorological elements monitored included temperature, relative humidity, wind speed and direction, and ultraviolet radiation intensity. A Cessna Model 182 aircraft was equipped to measure air temperature, relative humidity, oxidant, and both incoming and outgoing ultraviolet irradiation. Facilities to sample oxides of nitrogen, carbon monoxide and hydrocarbons in Todlar bags were also included. The trailers were located in Commerce and at El Monte airport. These two sites were 10 miles apart along a prevailing air trajectory. The airport site facilitated transfer of airborne samples. Periodic sampling and analysis was performed during the time of day which normally included contaminant buildup and maximum oxidant formation. Aircraft flights were scheduled for morning and afternoon on days of moderate to heavy smog. Vertical profiles were recorded over each ground site and Hawthorne airport, and samples were collected at specific altitudes within the inversion layer. Special investigations of smog fronts were made on several occasions. Samples collected aloft by ESSA were analyzed as part of a cooperative program. A total of nearly 500,000 data points was reduced, tabulated and presented. A detailed discussion of the data for September 29, a day on which very high oxidant was found, is presented to show the interrelationship between the ground data from Commerce and El Monte, the vertical profile data for three sites and the ESSA air trajectory data. This demonstrates the vast differences that can occur in a cross-section of the Los Angeles Basin and illustrates how the various data can be utilized in defining the aerometric history of a typical smoggy day. Additional data related to interesting and unusual phenomena which were documented in the data file are also discussed. (Author summary modified)
APTIC-25837

ATMOSPHERIC REACTION STUDIES IN THE LOS ANGELES BASIN. VOLUME II. COMMERCE GROUND DATA. 1969. (FINAL REPORT).

NAPCA Contract CPA 70-6, APRAC Proj. CAPA 7-68, Scott Proj. 1142, 535p., Feb. 16, 1970. NTIS: PB 194062
Personal Author Not Recorded.
Identifiers: *Los angeles, *Air quality measurements, Oxidants, Ground level, Lower atmosphere, Winds, Humidity, Temperature (atmospheric), Aldehydes, Aliphatic hydrocarbons, Peroxyacetyl nitrate, Carbon monoxide, Nitric oxide (no), Nitrogen dioxide (no2), Ozone, Ultraviolet radiation.

Data for the chemical and meteorological parameters measured at the Commerce Airport ground site for a comprehensive survey of the atmosphere of the Los Angeles basin are presented. The data were measured from mobile labs and from aircraft. Averages are given for ten minute time periods for the period from August 18 to November 14, 1969. Data from continuous instruments were normally recorded at one minute intervals during daytime working hours and at ten minute intervals overnite. Periodic data are inserted into the appropriate time periods. The parameters listed include temperature, dew point, relative humidity, winds, ultraviolet radiation intensity, total oxidant, ozone, peroxyacetyl nitrate, aliphatic aldehydes, nitric oxide, nitrogen dioxide, total hydrocarbons, and carbon monoxide.
APTIC-25856

ATMOSPHERIC REACTION STUDIES IN THE LOS ANGELES BASIN. VOLUME III. EL MONTE GROUND DATA. 1969. (FINAL REPORT).

NAPCA Contract CPA 70-6, APRAC Proj. CAPA 7-68, Scott Proj. 1142, 447p., Feb. 16, 1970. NTIS: PB 194063
Personal Author Not Recorded.
Identifiers: *Los angeles, *Air quality measurements, Oxidants, Ground level, Lower atmosphere, Winds, Humidity, Temperature (atmospheric), Aldehydes, Aliphatic hydrocarbons, Peroxyacetyl nitrate, Carbon monoxide, Nitric oxide (no), Nitrogen dioxide (no2), Ozone, Ultraviolet radiation.

Data for the chemical and meteorological parameters measured at the El Monte ground site for a comprehensive survey of the atmosphere of the Los Angeles basin are presented. The data were obtained from mobile labs and from aircraft measurements. Averages are given for ten minute time periods for the period from August 18 to November 7, 1969. Data from continuous instruments were normally recorded at one minute intervals during daytime working hours and at ten minute intervals overnite. Periodic data are inserted into the appropriate time periods. The parameters listed include temperature, dew point, humidity, winds, ultraviolet radiation intensity, total oxidant, ozone, peroxyacetyl nitrate, aliphatic aldehydes, nitric oxide, nitrogen dioxide, total hydrocarbons, and carbon monoxide.
APTIC-25857

FIRST OBSERVATIONS ABOUT ATMOSPHERIC ALLERGIC FUNGI IN SOUTHERN AND EASTERN BELGIUM.

(Premieres observations concernant les moisissures atmospheriques allergisantes dans le sud et l'est de la Belgique). Text in French. Acta Tuberc. Pneumol. Belg., 61 (1-2):141-154, April 1970. 6 refs.
L. Mottard, J. Remacle, J. L. Ramaut, and J. M. Petit.
Identifiers: *Fungi, *Air quality measurements, Seasonal, Belgium, Non-urban areas, Urban areas, Sampling methods, Micrometeorology.

Atmospheric mycoflora (spores, conidia, fragments of mycelia) from various buildings and open air areas in Liege, Hesbaye, Condroz, Ardennes, Est, Namurois, Hainaut, and Limbourg were isolated by exposing Petri dishes containing mashed prunes in a gelatine base to the atmosphere for 15 minutes, by subsequent incubation at 25 C and identification of the various taxa during autumn of 1968, during winter 1968/69, and during spring 1969. In the autumn 1968, 32 taxa were identified with yeasts, Penicillium 1, Cladosporium, Botrytis, and Alternaria fungi predominating in that order. In winter 1968/69, yeasts, Cladosporum, Penicillium 1, Alternaria, and Penicillium 3 fungi predominated among 39 taxa. In the spring of 1969, Cladosporium fungi, yeasts, and Epicoccum fungi predominated among 21 taxa. Thus in the spring, the previously almost non existent Epicoccum proliferated while Penicillium and Aspergillus were sharply reduced. An analysis of the findings indicates that microclimate plays an important role in the occurrence or predominance of specific fungi which partly accounts for the seasonal differences recorded. Similar analyses performed in France by other methods yielded results at variance with the above findings which points up the necessity of using identical media for comparative studies.
APTIC-25876

HORIZONTAL AND VERTICAL DISTRIBUTION OF LEAD PARTICULATES IN AIR AROUND A BUSY ROAD IN YOKOHAMA CITY.

(Shigaichi ni okeru shadoshuben no taikichu namari no bunpu). Text in Japanese. Nippon Koshu Eisei Zasshi (Japan J. Public Health), 17 (6):307-312, June 15, 1970. 10 refs.
Yoshitaka Kobayashi, Masahiro Hori, and Kenzaburo Tsuchiya.
Identifiers: *Yokohama, *Air quality measurements, *Lead compounds, Annual, Diurnal, Seasonal, Streets, Urban areas, Engine exhausts, Vehicles, Polarographic methods, Hi-vol samplers, Ground level, Lower atmosphere, Cadmium compounds.

Investigation of lead concentrations of air around a road having heavy motor traffic in Yokohama city was reported. The air samples for lead determination were collected by means of a high-volume air sampler. Lead particles collected on the filters of the sampler were analyzed by a polarographic method after a simplified pre-treatment. Concentrations of lead in the air over the sidewalk of the road were 2 to 5 micrograms per cubic meter. At a sampling station 100 meters from the road, the average annual concentration was 1.1 to 1.3 micrograms per cubic meter. This value was as low as that of the average in residential areas of the city. The pattern of the average diurnal concentrations of lead showed a peak in the morning and another in the evening, coinciding with the rush hours of urban motor vehicle traffic. Concentrations of lead in air decreased with the distance from the road as far as 100 meters, but became constant further from that point. The vertical concentrations of lead were almost constant at 20 meters above ground at a point 100 meters away from the road. Concentrations of lead were generally the highest during winter and the lowest in summer. The average concentration for 7 years was 0.75 micrograms/cu m, lower than that of Los Angeles, Philadelphia, and Cincinnati, corresponding to the suburban areas of these cities. The reason could not be determined at the present stage. Cadmium concentration was about 1/100 of lead concentration (average for September and October was 0.009 micrograms/cu m). No correlation between cadmium and lead concentration could be observed, probably because the sampling was not of sufficient number, but it may also be that the source of cadmium is not the automobile exhaust gas. Further studies will be made to determine whether or not lead concentration of the above magnitude would accumulate in human bodies.
APTIC-25881

CONTINUOUS AIR MONITORING PROJECTS: 1968 DATA TABULATIONS AND SUMMARIES, ST. LOUIS.

NAPCA Pub. APTD 69-19, 103p., Dec. 1969.
NTIS: PB 194762
Personal Author Not Recorded.
Identifiers: *Continuous air monitoring program (camp), *St louis, *Air quality measurements, Annual, Diurnal, Hourly, Seasonal, Colorado, Chicago, Cincinnati, Philadelphia, Washington d c, Oxidants, Soiling index, Continuous monitoring, Hydrocarbons, Carbon monoxide, Nitric oxide (no), Nitrogen dioxide (no2), Sulfur dioxide.

Graphs are presented showing the seasonal diurnal patterns in St. Louis for carbon monoxide, nitric oxide, nitrogen dioxide, sulfur dioxide, total hydrocarbons, and total oxidants. Hourly average concentrations by month are presented tabularly, while soiling index values were obtained from a 2-hr integrated sample. Annual frequency distributions of the data pertaining to gases and soiling index are presented for the six Continuous Air Monitoring Program stations in Chicago, Cincinnati, Denver, Philadelphia, St. Louis, and Washington, D. C.
APTIC-25992

ATMOSPHERIC REACTION STUDIES IN THE LOS ANGELES BASIN. (FINAL REPORT).

NAPCA Contract CPA 22-69-19, APRAC Proj. CAPA 7-68, Scott Proj. 1116, 78p., July 28, 1969. 2 refs. NTIS: PB 194058
Personal Author Not Recorded.
Identifiers: *Los angeles, *Smog, *Air quality measurements, Diurnal, Oxidants, Column chromatography, Monitoring, Altitude, Ground level, Lower atmosphere, Winds, Humidity, Temperature (atmospheric), Aldehydes, Acrolein, Formaldehydes, Hydrocarbons, Peroxyacetyl nitrate, Carbon monoxide, Nitric oxide (no), Nitrogen dioxide (no2), Ultraviolet radiation.

A comprehensive survey of the atmosphere of the Los Angeles Basin was conducted from August 22 to November 14, 1968. A large number of contaminants were determined continuously and periodically, and readings of pertinent meteorological factors were made at two ground level sites and in an aircraft at several altitudes above the ground sites. The pollutants measured included carbon monoxide, oxidant, nitric oxide, nitrogen dioxide, total hydrocarbons, individual C1 to C10 hydrocarbons, peroxyacetyl nitrate, formaldehyde, acrolein, and total aliphatic aldehydes. The meteorological monitoring included temperature, relative humidity, wind speed and direction, and ultraviolet radiation intensity. More than 100 individual hydrocarbons were chromatographically determined in the tenth of a ppb range by use of a capillary column with on-column freeze-out. The individual pollutants are discussed through graphic illustrations of diurnal patterns for five selected days centered around the major smog episode encountered in the study. A brief explanation is given of the pattern for each of the five days based on visual inspection of the data. The smog took the form of clouds which contained visible voids in which low oxidant values were recorded. Oxidant was generally much higher at the leading edge of smog fronts than within smog clouds.
APTIC-25994

KANAWHA VALLEY AIR POLLUTION STUDY.

NAPCA Pub-APTD-70-1, 369p., March 1970. 96 refs. NTIS: PB 194881
Personal Author Not Recorded.
Identifiers: *Area surveys, *Kanawka valley, Control programs, Costs, Materials deterioration, West virginia, Odors, Oxidants, Particulates, Industrial emission sources, Emission inventories, Measurement methods, Winds, Temperature (atmospheric), Stability (atmospheric), Sulfuric acid, Aldehydes, Carbon monoxide, Nitrogen dioxide (no2), Sulfur dioxide, Hydrogen sulfide.

A cooperative study of air pollution in the upper Kanawha Valley of West Virginia was undertaken. Air quality measurments were made, meteorological parameters were evaluted, odor studies were undertaken, and existing information was collected and evaluated. A pollutant emission inventory was compiled from fuel combustion sources, refuse disposal, gasoline and solvent evaporation losses, chemical processes, concrete batch plants, metallurgical processes, wood products, and a number of other industrial processes. Wind data, sunshine, temperature and stability, and climatology are discussed. Measurements of particulate matter, sulfur dioxide, carbon monoxide, oxidants, nitrogen dioxide, hydrogen sulfide, sulfuric acid mist, and total aldehydes are included. The relationship between air quality and emissions is mentioned. Air quality goals and reduction plans are discussed. Materials deterioration is evaluated and control economics are considered. Instruments for measurements are also listed.
APTIC-25996

AIR POLLUTION BY CARBON MONOXIDE AT BORDEAUX.

(La pollution atmospherique par oxyde de carbone a Bordeaux). Text in French. Pollut. Atmos. (Paris), no. 45:16-18, Jan.-March 1970.
P. Coudray, and P. Freour.
Identifiers: *Carbon monoxide, *Air quality measurements, *Bordeaux, Diurnal, Hourly, France, Streets, Urban areas, Automotive emissions, Vehicles, Sampling methods.

Pollution by carbon monoxide in the city of Bordeaux was investigated from June 1967 to January 1969. Samples were taken at various crossroads and in various districts of the city, at points where traffic was heavy or light. After analyzing 4227 air samples, the objectified overall average pollution was 21.6 ppm of carbon monoxide. The figure varies, however depending on the zone studied, ranging from 30 to 20 ppm on the outer ring roads to 1.5 ppm in streets away from the main roads. There is a considerable difference in the level of pollution, depending on whether the air is sampled near traffic-lights or at some distance from them. The objectified figures are high in the morning, reaching a maximum between 11:30 am and 1 pm, and between 5:30 pm and 7 pm. On the whole, the objectified figures are roughly the same as those found in large built-up cities in France such as Lyons, and approach those for Paris.
APTIC-26013

ATMOSPHERIC DUSTS COLLECTED OFF THE WEST AFRICAN COAST.

Nature (London), 229 (5280):105-107, Jan. 8, 1971. 5 refs.
R. Chester, and L. R. Johnson.
Identifiers: *Air quality measurements, *Dusts, *Africa, Mineral products, Great britain, Particle size, Winds, Oceans, Chemical composition.

The north-east trade winds over the North Atlantic receive a readily available supply of dust from the Sahara Desert, and have been sampled at Barbados and Bermuda. In the present investigation, samples were collected off the West African coast between April 22 and May 5, 1969. At most stations, the dust averaged considerably less than 10 micrograms/cu m of air. Compared with land-derived material in several deep sea sediments adjacent to the African coast, the dusts contained a greater percentage of material in the 2-8 micron class and a smaller percentage in the less than 2 micron class. The mineral characteristics of the north-east trade dusts were significantly different than those of dusts collected in the boundary region between these winds and westerly winds, particularly with respect to minor minerals.
APTIC-26016

REPORT ON AIR POLLUTION STUDY, NAOETSU REGION.

Naoetsu chiiki no taiki osen chosa hokokusho. Text in Japanese. 104p., March 1970.
Personal Author Not Recorded.
Identifiers: *Niigata prefecture, *Air quality measurements, Annual, Monthly, Seasonal, Leaves, Plant damage, Plant growth, Inhibition, Japan, Industrial areas, Suspended particulates, Dust fall, Lead peroxide candle, Electroconductivity analyzers, Hi-vol samplers, Fluorides, Sulfur dioxide, Sulfur oxides.

From August 1967 through October 1969, a study on air pollution was undertaken in the Naoetsu region, Niigata Prefecture. Sulfur oxides were measured by the PbO_2 and the electroconductivity methods. At the same time, the pararosaniline method was partly applied in order to measure merely sulfur dioxide. Suspended particulate matters and dust fall were respectively measured by the British standard suspended particle matter meter and the high volume air sampler. The alkali filter paper method and lime filter paper method (LTP method) were applied in the measurement of fluorides. Sulfur oxides recorded 0.26 mg SO_3/100 sq cm PbO_2 in 1967; in general, it is increasing yearly. In reference to the seasons, in some places the level increased in spring and summer and decreased in autumn and winter; the contrary occurred in other places. In two or three places around the industrial area, a comparatively high level of concentration was detected, but the pollution was slight. Suspended particulate matter recorded 11.4 t/sq km/month in 1967 and is gradually increasing; however, the level was about that of a medium industrial city. The level of drifting dust was generally high; attention must be given to the sectional pollution. As to fluoride sectional pollution was recognized. The problem of the content of sulfur and fluorine in the test plants still needs further study; however, the result of the analysis of fluorine content briefly coincides with the other results on air pollution studies. This report includes preparatory study on the effect of air pollution upon plants in Naoetsu region. As a result, suppression of growth and abnormal leaves in the plants in Hinode town and Fukuhashi in Naoetsu city were recognized as notable.
APTIC-26026

REPORT ON AIR POLLUTION STUDY (NO. 4).

(Taikiosen chosa kokoku). Text in Japanese. Akita-ken Eisei Kagaku Kenkyu Sho-Ho (Report Akita Prefect. Inst. Public Health), no. 14:365-382, 1970.
Eiichiro Kodama, Eiichi Miura, Yoshiaki Hoga, Tadakazu Funaki, and Kunitaro Nakao.
Identifiers: *Akita, *Air quality measurements, Annual, Diurnal, Monthly, Japan, Urban areas, Suspended particulates, Winds, Sulfur dioxide.

Suspended particulate matter and sulfur dioxide were measured in ten places in Akita city from January 1969 to December 1969. The average suspended particulate matter in the four places was 6.28 tons/sq km/month which is a one ton increase compared with last year and about the same with the year before last. Concerning monthly averages, March marked high recording 10.34 tons/sq km; geographically, place No. 5 recorded the highest as 15.13 tons/sq km in March. The average SO_2 in the ten places was 0.335 mg SO_3/100 sq cm/day which is a decrease compared with last year's 0.426 mg and the year before last's 0.381 mg. This fact suggests that consumption of such fuels as coal and crude petroleum have not changed recently. The testing place with highest yearly average was situated at Ibarashima region (No. 10), recording to 0.817 mg/100 sq cm/day; the second highest was situated at the street crowded with buildings (No. 5), which recorded 0.700 mg/100 sq cm/day. Concerning monthly variations, the highest was No. 5 recording 2.352 mg/100 sq cm/day (August); the second highest was No. 10 recording 1.612 mg/100 sq cm/day (May). Wind seemed to have a great effect on air pollution. The observation data of the Akita Local Weather Bureau during the same period showed that northwest winds totaled 302 times in December, marking highest; the second highest was southwest, totaling 172 times in July. The yearly average wind speed was 4 m/sec; northwest 7.1 m/sec was the strongest.
APTIC-26027

ON THE INVESTIGATION OF PUBLIC NUISANCE IN AJIMANO AREA, TAKEFU CITY.

(Takefu-shi Ajimino-chiku no kogai chosa ni tsuite. Text in Japanese. Fukui-ken Eisei Kenkyusho Kenkyu Hokoku (Rept. Fukui Prefect. Inst. Public Health), no. 2:1-21, Sept. 1968.
Hikohei Kishi, Sadaharu K[illegible]agawa, Katsuo Shioya, Akiko Tanioka, and [illegible]imiko Aoki.
Identifiers: *Takefu, *Sulfur oxides, *Hydrogen sulfide, Diurnal, Monthly, Japan, Urban areas, Chemical processing, Paper manufacturing, Air quality measurements, Dispersion, Winds, Carbon disulfide.

Measurements of hydrogen sulfide and sulfur oxides in the air were made with meteorological observations after three months' preliminary investigation on public nuisance by waste gas at a carbon disulfide factory and a cellophane factory in Ajimano area, Takefu city, Fukui Prefecture. Meteorological observations were made at ten o'clock once a day; H_2S was investigated by a zinc acetate cylinder method and sulfur oxide was in-

vestigated by an alkali filter method during the period from March 9, 1967 to April 15, 1968 in 18 points. There were more northwest-by-west winds from November to January; the wind velocity was 6.6 m/sec at the maximum, and the average wind velocity by each month was 1.1 - 2.6 m/sec. The H2S was high throughout the year in two points which were 270 m north and 280 m southeast-by-east of the factory; the average figures were 6.45 (3.45-12.13) micrograms/day/100 sq cm and 5.78 (3.00-9.80) micrograms/day/100 sq cm. The average figure of all points and the whole period was 3.30 micrograms/day/100 sq cm and it was high in April, August, and February. An assumed picture of contaminated areas was made by the measurement figure at each point and the contaminated areas extended to the northwest from the center of the factory. The contaminated degree was remarkable in the circumference of the factory and about 1000 in northwest and southwest, and 600 m northeast and southwest. The sulfur oxide showed an average figure of 1.06 (0.54-2.67) mg day/100 sq cm 280 m southeast-by-east from the factory. The average figure was 0.32 (0.13-0.42) mg/day/100 sq cm; problem amounts as air pollution were not detected.
APTIC-26028

ON THE AIR POLLUTION BY RED OCHRE FACTORIES IN MITSU-CHO. OKAYAMA PREFECTURE, JAPAN.

(Mitsu-cho bengara seizo-gyo no taikiosen ni
tsuite). Text in Japanese. Okayam-Ken Eisei
Kenkyusho Nenpo (Ann. Rept. Hyg. Lab.
Okayama Prefecture), no. 15:153-158, March 1968.
11 refs.
Norikatsu Hamamura, Ayamichi Shigeta, Yoichi
Takaya, and Hirokatsu Okada.
Identifiers: *Mineral processing, *Topographic interactions, *Sulfur dioxide, *Sulfur trioxide, Diurnal, Iron, Japan, Mountains, Valleys, Smokes, Air quality measurements, Winds.

The three red ochre factories in Mitsu-cho and Tatebe-cho in Okayama Prefecture produce annually 7200 tons red ochre, and the amount of production has increased in recent years. Sulfur dioxide and sulfur trioxide, which are produced when ochre (Fe203) is manufactured by burning FeSO4.7H2O, are the cause of air pollution in these towns. The three factories are located in the folds of mountains where dwelling houses are comparatively few. During daytime, smoke produced from the factories is blown up toward the hill top by the wind from the valley, and air pollution is not in evidence; but at night, smoke is blown down by the wind from the mountain, and air pollution is evident. Four studies were undertaken at the four places selected from six places of varied conditions; a preliminary daytime study, two 24-hour studies, and one eight-consecutive-days study. At the fourth spot which is located in the valley with one of the three factories, air pollution is of the highest level; in all nights when studies were done, SO2 was over 0.5 ppm, and the mean value of SO2 from six pm to nine am was 0.41 ppm. At the second spot which is in the outskirts of that valley, air pollution was evident during the period from nine pm to nine am; from 11 pm to five am, the mean value of SO2 was over 0.1 ppm. The wind is a potent influence at the second spot. Air pollution at the first spot was about the same as at the second spot, and the third spot was less polluted but was in proportion with the second spot.
APTIC-26029

RESEARCH ON THE ACTUAL CONDITION OF AIR POLLUTION. 3. DEGREE OF AIR POLLUTION IN KANAGAWA PREFECTURE. (MEASURED BY ALKALINE PAPER FILTRATION METHODS).

(Taiki osen no jittai chosa. 3. Kanagawa-ken ka no
taikiosendo. Arukari roshi). Text in Japanese.
Kanagawa-Ken Taiki Osen Chosa Kenkyu
Hokoku (Tech. Rept. Air Pollution Yokohama-
Kawasaki Ind. Area), no.12:40-44, Nov. 1969.
Personal Author Not Recorded.
Identifiers: *Kanagawa prefecture, *Air quality measurements, Annual, Japan, Industrial areas, Oceans, Vehicles, Chlorides, Nitrogen dioxide (no2), Sulfur trioxide, Ions.

Levels of air pollution were measured by the alkali filter paper method throughout the whole area of Kanagawa Prefecture from April 1968 to March 1969, continued from the previous year. The assigned areas were nine places in Yokohama, four in Kawasaki, two in Yokosuka and Hiratsuka, and one in Chigasaki, Odawara, and Fujisawa respectively. The values for sulfur dioxide, nitrogen dioxide, and chloride ions were determined. Like last year, the high value was shown for SO3 in Keihin sea-side industrial areas such as Oshimamachi in Kawasaki city and port-side Kawanakajima, Tsurumi and Nishi wards in Yokohama. In Hiratsuka city, the SO3 value was as high as in Kawasaki and Tsurumi, as usual. The air pollution is still thought to be due to the big source in the neighborhood. For NO2, the level was as high as last year in cities where traffic was heavy. Generally there is a trend for NO2 to increase every year. Chloride ion showed as high of a level as before in sea-side areas.
APTIC-26030

REPORT ON THE STUDY OF AIR POLLUTION IN NISHIYODOGAWA WARD.

(Nishiyodogawa-chiku taiki osen chosa hokoku).
Text in Japanese. 66p., March 1968.
Personal Author Not Recorded.
Identifiers: *Osaka, *Air quality measurements, *Sulfur oxides, Diurnal, Japan, Urban areas, Ground level, Lower atmosphere, Winds, Nitrogen oxides.

In order to investigate the distribution of concentrations of air pollutants in Nishiyodogawa Ward in Osaka City, sulfur oxides and nitrogen peroxide were measured in many points during the period from June 1967 to March 1968. Nishiyodogawa Ward was divided into 400 meters square; one point of the measurement was set up about 10 m above the ground in one division as a rule. The measurements were made by alkaline paper filtration method. The mean concentration of sulfur oxides was more than 3 mg/100 sq cm/day at 11 points; of these, seven points were situated in the south-west quadrant when Nishiyodogawa Ward was divided into 4 quadrants. The concentration of sulfur oxides showed maximum values such as 10.56, 8.24, and 7.80 mg/100 sq cm/day in this south-west quadrant. The mean concentration of sulfur oxides in all districts showed minimum values during the period from September 28 to October 6, when it blew from the north, northeast, -east and there was no west wind blowing. But in these days, at the measurement point No. 69, sulfur oxides showed a maximum of 8.24 mg/100 sq cm/day. From this, it was suggested that this point was affected by the source of air pollution in the north-north-east, north-east, -east areas. The mean concentration of sulfur oxides in all districts was maximum during the period from January 19 to 22, when it blew comparatively hard from the west-north-west and from the west. In those days, the concentration showed values of more than 5 mg/100 sq cm/day: 7.80, 7.39, 6.06, and 5.23 at 4 points.
APTIC-26031

PRELIMINARY SURVEY OF THE AIR POLLUTION IN TOKUSHIMA PREFECTURE, PART VII.

(Tokushima-ken ni okeru taiki osen chosa--dai
nana ho). Text in Japanese. Tokushima-Ken Eisei
Kenkyusho Nenpo (Ann. Rept. Tokushima
Prefect. Public Health Lab.), no. 9:8-34, Feb. 1970.
2 refs.
Masumi Matsuoka, Toshio Kitamura, and Ko
Tawara.
Identifiers: *Tokushima prefecture, *Air quality measurements, Annual, Diurnal, Hourly, Seasonal, Japan, Industrial areas, Suspended particulates, Sulfur dioxide.

A survey of sulfur dioxide and suspended particulates in the east part of Tokushima Prefecture undertaken from October 1968 to September 1969 was conducted. The air-pollution auto-analyzer (set in Imagire industrial area on the north bank of Yoshino River and Anan City) and the anemometer and anemoscope (set at Imagirehimon Observatory, Anan Municipal Health Center and Nagakawa Town Office) were used. The results are examined in terms of the environmental standard of oxidized sulfur according to Article nine of the Fundamental Law of Countermeasures Against Public Nuisance. During the year, the percentage when the hourly value was maintained less than 0.2 ppm was 100%. The number of days which had an average of less than 0.05 ppm hourly value was 99.6% in Imagire industrial area and 83% in Anan. Hours of less than 0.1 ppm was 99.7% in Imagire industrial area and 99.1% in Anan. The annual average of the hourly values was 0.028 ppm in Imagire industrial area and 0.032 ppm in Anan. Summer had high values which were influeced by factories located in the south and southeast part of this area. Suspended dust was 0.072 mg/cu m/year in Imagire industrial area and 0.129 mg/cu m/year in Anan.
APTIC-26036

DUST AND SOOT NUISANCES AT A METALLURGICAL COKING PLANT AND IN ITS ENVIRONMENT.

For primary bibliographic entry see Field 01.
APTIC-26040

AN OUTLINE OF THE RESULTS OF AIR POLLUTION MEASUREMENTS IN THREE PLACES IN TOKYO.

(Tokyo tonai sankasho no taiki osen sokuteimo
sokuteikekka no gaiyo). Text in Japanese. 53p.,
1969.
Personal Author Not Recorded.
Identifiers: *Tokyo, *Air quality measurements, Annual, Hourly, Urban areas, Dusts, Saltzman method, Electroconductivity analyzers, Infrared spectrometry, Carbon monoxide, Nitric oxide (no), Nitrogen dioxide (no2), Sulfur dioxide.

In 1963, the Ministry of Health and Welfare established Automatic Air Pollution measuring stations in three places in Tokyo; since January 1964, sulfur dioxide, dust, carbon monoxide, nitrogen dioxide, and nitric oxide have been measured in the National Hygienic Laboratory. The results of the above measurements carried out from January 1968 through December 1968 are outlined. Sulfur dioxide was measured by the electrical conductivity method; suspended particulate matter, by the scattered ray method; carbon monoxide, by the infrared absorption method; and nitric oxide, by the colorimetric method using Saltzman's reagent. Carbon monoxide and suspended particulate matter increased a little over the past year; nitric oxide and nitrogen dioxide did not change; and sulfur dioxide slightly decreased. The average of the three places computed from the yearly average of the hourly amount are as follows: carbon monoxide recorded 5.1 ppm, which is 1.9 ppm greater than 1964, 1.0 ppm greater than 1965, 0.7 ppm greater than 1966, and 0.2 ppm greater than 1967; nitric oxide recorded 6.3 ppm which is 3.1 ppm greater than 1964, 1.6 ppm greater than 1965, 0.1 ppm greater than 1966, but 0.4 ppm less than 1967; nitrogen dioxide recorded 3.0 ppm which is the same as 1967 but 1.0 ppm greater than 1964, 0.2 ppm greater than 1965, and 0.2 ppm less than 1966; and sulfur dioxide recorded the highest in 1964, increasing yearly for three years but slightly decreasing this year.
APTIC-26042

STUDIES ON AIR POLLUTION OF NEW DEVELOPING INDUSTRIAL CITY MIZUSHIMA, OKAYAMA PREFECTURE.

(Okayama-ken minami shinsangyo toshi
Mizushima chiiki ni okeru taiki osen). Text in

Japanese. Okayama-Ken Eisei Kenkyusho Nenpo (Ann. Rept. Hyg. Lab. Okayama Prefect.), no. 16:108-124, March 1969. 1 ref.
Naoji Kitamura, Norikatsu Hamamura, Ichiro Torii, Tadashi Moriwake, and Shogo Ichikawa.
Identifiers: *Mizushima, *Air quality measurements, Annual, Monthly, Seasonal, Japan, Industrial areas, Suspended particulates, Lead peroxide candle, Samplers, Dispersion, Winds, Iron compounds, Sulfur dioxide.

Crude petroleum used in Mizushima region, Okayama Prefecture, has been greatly increasing from 2490 kl/day (1967) to 4250 kl/day (1968). Suspended particulate matter and sulfur dioxide were measured in this region from January 1968 through December 1969. Suspended particulate matter was measured by setting the British standard Deposit Gauge at one place in old Kurashiki city and at four places in the Mizushima region. Sulfur dioxide was measured by applying the lead dioxide method, setting the equipments at 35 more places other than the five places mentioned above. Suspended particulate matter increased only 1 t/sq km/month in the five years from 1964; the average of 1969 was about 7 t. Iron was expected to increase since 1967; however, no great change was observed. The level increased from spring to summer; recorded high in the three places near the industrial area and low in the other two places. Sulfur dioxide increased greatly from 1967 to 1968. The annual change of sulfur dioxide almost coincides with the annual change of crude petroleum used in Mizushima region. How far the mutual relationship keeps on, and whether or not the inclination will vary due to high chimneys are matters of great concern. The level was low in the northeast part far from the industrial area and high in the southeast part near the industrial area. The level was high from May to August at Fukuda Junior High School situated north-northeast of the industrial area and high at 23 places in the east side from November to February while the west wind was blowing hard.
APTIC-26043

THE INVESTIGATION OF THE ACTUAL CONDITION OF AIR POLLUTION. 1.1 AIR POLLUTION IN THE KEIHIN INDUSTRIAL DISTRICTS.

(Taikiosen no jittai chosa. 1. Keihin-kogyo chitai no taikiosen (1)). Text in Japanese. Kanagawa-Ken Taiki osen Chosa Kenkyu Hokoku (Tech. Rept. Air Pollution Yokohama-Kawasaki Ind. Area), no. 12:5-24, Nov. 1969.
Personal Author Not Recorded.
Identifiers: *Kawasaki, *Yokohama, *Air quality measurements, Annual, Diurnal, Monthly, Industrial areas, Dust fall, Soot fall, Lead peroxide candle, Samplers, Sulfur trioxide.

The amount of the falling soot and dust were measured using a deposit gauge; the concentration of sulfur dioxide was measured by the PbO2 method since 1957 in Yokohama and Kawasaki Cities, Kanagawa Prefecture. The results of the measurements for one year from January to December 1968 are reported. Falling soot and dust was measured at 34 places; 26 spots in Yokohama and eight spots in Kawasaki; results were 48 t/sq km/month at the maximum, and 4.5 t/sq km/month at the minimum. The obtained numerical value was a crablike condition in comparison with that of the previous year. Sulfur trioxide was measured at 48 places; 38 spots in Yokohama and 10 spots in Kawasaki; sulfur trioxide increased 14.2 % at the industrial district and decreased at the other places in Yokohama in comparison with that of 1967. It had a tendency to increase a little at the industrial district, and to decrease or move sidewise at the other places in Kawasaki. Among the 48 measuring places, three places showed the average concentration for one year as more than 4 mg SO3/day/100 sq cm in terms of PbO2. Among the three places, the average concentration for the year showed 5.00 mg SO3/day/100 sq cm in terms of PbO2 at the maximum.
APTIC-26044

ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE (I).

(Okayama-shi ni okeru taiki osen. (I)). Text in Japanese. Okayama-Ken Eisei Kenkyusho Nenpo (Ann. Rept. Hyg. Lab. Okayama Prefect.), no. 15:146-152, March 1968.
Norikatsu Hamamura, Ayamichi Shigeta, Yoichi Takaya, Motoichi Kondo, and Hirokatsu Okada.
Identifiers: *Okayama, *Air quality measurements, Annual, Diurnal, Monthly, Japan, Industrial areas, Suspended particulates, Lead peroxide candle, Samplers, Sulfur dioxide, Sulfur trioxide.

The form of air pollution in Okayama City seems to be due to its features as a city rather than to the factories. Therefore, since 1964, suspended particulate matter and sulfur dioxide have been measured by providing five test points in the city, using the British standard deposit gauge and the PbO2 method, respectively. The results of the measurements were as follows: the range of suspended particulate matter was 2 - 11 t/sq km/month; yearly increases or seasonal changes were not recognized. There was little change according to their places and no test point recorded especially high levels. The average recorded 6 t/sq km/month was not especially high compared with other cities. Three years' average of SO2 was 0.42 SO3 mg/day 100 sq cm PbO2 and in the urban territories, 0.34 - 0.53 SO3 mg/day 100 sq cm PbO2; a yearly change was not recognized. However, at test points around the industrial area, the average of 1965 was 0.29 SO3 mg/day 100 sq cm PbO2; in 1966, 0.46; and in 1967, 0.42, increasing slightly.
APTIC-26045

DEGREE OF AIR POLLUTION IN KANAGAWA PREFECTURE.

(Taiki osen no gittai chosa. 3. Kanagawa-ken-ka no taiki osendo--arukari roshiho). Text in Japanese. Kanagawa-Ken Taiki Osen Chosa Kenkyu Hokoku (Tech. Rept. Air Pollution Yokohama-Kawasaki Ind. Area), no. 11:37-40, Feb. 1969.
Personal Author Not Recorded.
Identifiers: *Kanagawa prefecture, *Urban areas, *Air quality measurements, Annual, Japan, Oceans, Chlorides, Nitrogen dioxide (no2), Sulfur trioxide.

The degree of air pollution was measured by the alkaline paper filtration method in all areas of Kanagawa Prefecture from April, 1967 to March, 1968. In nine districts of Yokosuka City, two districts of Kamakura City, one district of Zushi City, one district of Hahama City, two districts of Hiratsuka City, one district of Odawara City, one district of Chigasaki City, and one district of Fujisawa City, the following pollutants were measured: sulfur trioxide, nitrogen dioxide, and chloride ion. As in every year, the concentration of sulfur trioxide was higher in the sea-side areas of Kawasaki City and Tsurumi Ward. Without regard to season, it was kept high all the year round, and continued to increase year by year in those areas. In Hiratsuka City, it was as high as in Kawasaki City and Tsurumi Ward as compared with the results in the last year. It is suggested that there is a large source of pollution in those areas. The concentration of nitrogen dioxide was high in the cities as in the last year, and the maximum value was 0.275 mg/day/100 sq cm. It tends to increase year by year. The chloride ion was also high in the sea-side areas as in the last year.
APTIC-26052

REPORT OF THE SURVEY OF AIR POLLUTION OF ANNAKA AREA IN GUNMA PREFECTURE.

(Gunma-ken Annaka chiku kankyo osen chosa kkeka hokoku-sho). Text in Japanese. 108p., June 1970.
Personal Author Not Recorded.
Identifiers: *Primary metallurgical processing, *Air quality measurements, Diurnal, Hourly, Zinc, Japan, Industrial areas, Stack gases, Smokes, Dust fall, Atmospheric movements, Temperature gradient, Topographic interactions, Lead compounds, Sulfur dioxide.

In May and October in 1969, oxidized sulfur, suspended dust, metallic ingredients, and meteorological conditions (only in May) were surveyed. In Annaka, a zinc smeltery is located on a steep slope, and the lay of the land is complicated; the air current there is considerably disorderly, and ordinary diffusion equations such as Sutton and Bosanquet's cannot be applied. Also, atmospheric temperature of the plateau and the basin goes into reverse; this influences atmospheric pollution conspiciously in winter. The highest amount of sulfur dioxide was 0.04 ppm; less than 0.03 ppm was measured at most of the stations. The hourly average of 8 daytime hours was a maximum of 0.1 ppm at a spot within 500 meters on the south side of the zink smeltery. One of the characteristics of this area is that a high level of pollution for a short period occurs frequently. The possible cause of this is that the smoke producing equipment is not in good condition for emission and diffusion. Pollution did not always correspond with the amount of smoke emitted. As to the extension of the polluted area, the south side of smoke emitted. As to the extension of the polluted area, the south side of the smeltery showed a remarkably low level 600-700 m from the smeltery; but on the east side, a considerably high level of pollution remained more than 1 km from the smeltery. The average of total amount of suspended dust was 214 micrograms/cu m, the highest measured at the measuring stations was 365 micrograms/cu m, and the daily highest was 639 micrograms/cu m. The average amount of cadmium was 0.10 micrograms/cu m (May) and 0.04 micrograms/cu m (October). The average amount of lead was 1.13 micrograms/cu m (May) and 0.68 micrograms/cu m (October); the amount of lead at several measuring stations was remarkably higher than that of the other cities and towns. The amount of cadmium and lead decreased in October. No relation was found between the hourly changes of dust and SO2, but some relation of the changes of the hourly average of the two during the 8 daytime hours was recognized.
APTIC-26054

ACTIVATION ANALYSIS OF AIRBORNE SELENIUM AS A POSSIBLE INDICATOR OF ATMOSPHERIC SULFUR POLLUTANTS.

For primary bibliographic entry see Field 03.
APTIC-26069

HYGIENIC STUDIES OF THE ATMOSPHERE IN SETTLEMENTS OF THE ZURICH REGION.

(Lufthygienische Untersuchungen in Siedlungsgebieten der Region Zurich). Text in German. Eidgenoessische Technische Hochschule, Zurich (Switzerland), Thesis (Ph.D.),, Zurich, Juris Druck und Verlag Zurich, 1969, 171p. 83 refs.
Thomas Theodor Mueller.
Identifiers: *Zurich, *Air quality measurements, Diurnal, Seasonal, Europe, Urban areas, Internal combustion engines, Winds, Temperature (atmospheric), Formaldehydes, Aliphatic hydrocarbons, Butanes, Isobutanes, Isopentanes, Carbon monoxide, Nitrogen oxides, Nitrogen dioxide (no2), Sulfur dioxide.

The atmospheric concentrations of nitrogen dioxide, formaldehyde, carbon monoxide, sulfur dioxide, isobutane, n-butane, and isopentane were measured in 3 locations of the Zurich region in order to obtain data about the degree of pollution in settlements of different size and to determine the effect of traffic density, wind intensity, and temperature on the degree of pollution. The daily and seasonal pollution fluctuations were also recorded. The median concentrations found were as follows: SO2, 0.032 ppm; NO2, 0.023 ppm; CH2O, 0.027 ppm; CO, 15.0 ppm; isobutane, 0.012 ppm; n-butane, 0.032 ppm; and isopentane, 0.026 ppm. The SO2 concentrations in the city in winter were 4 to 8 times higher than in summer. Also the NO2 concentration tended to be higher in winter than in summer while the findings were reverse with CH2O. In smaller settlements, the differences were less marked. As to the daily varia-

tion, the NO2 concentration tended to decrease around noon; SO2 concentrations were highest in the morning and lowest in the evening; and CO concentrations was highest during traffic jams. N-butane and isopentane exhibited their concentration peak at around 18 hours. Traffic had an effect only on CO concentration. Wind decreased pollution levels of NO2 and of CH2O. The CH2O concentration increased with increasing temperature. Deflection of traffic from one locality by means of a detour which decreased traffic density by 56% decreased levels of the various pollutants correspondingly by 42-55%.
APTIC-26081

CHATTANOOGA, TENNESSEE – ROSSVILLE, GEORGIA INTERSTATE AIR QUALITY STUDY 1967-1968.

National Air Pollution Control Administration, Durham, N. C., Div. of Abatement, NAPCA Pub.-APTD-0583, 120p., Oct. 1970. 25 refs. NTIS: PB 195145
Grady T. Helms, James H. Southerland, Kenneth R. Woodward, Ibrahim J. Hindawa, and Dale H. Coventry.
Identifiers: *Chattanooga, *Rossville, *Area surveys, Plant damage, Synergism, Corrosion, Fading, Georgia, Tennessee, Urban areas, Oxidants, Suspended particulates, Industrial emission sources, Non-industrial emission sources, Emission inventories, Winds, Inversion, Topographic interactions, Hydrofluoric acid, Hydrocarbons, Carbon monoxide, Nitrogen dioxide (no2), Sulfur dioxide, Sulfides.

Results are presented for an air quality survey conducted in the Chattanooga, Tennessee - Rossville, Georgia interstate area from October 1967 through April 1969. The survey included air quality measurements, meteorological measurements, vegetation effects measurements, material effects studies, and an emissions inventory. The climatology of the area was found to be characterized by light average wind speeds, topographically confined flow, and frequent inversion conditions -- factors associated with poor pollutant dispersion. A suspended particulate problem exists in the area, with maximum concentrations in the downtown Chattanooga-Rossville valley and the Volunteer Army Ammunitions Plant (VAAP), where nitrogen oxide concentrations are also extremely high. Sulfur dioxide concentrations are lower than national standards; oxidant, hydrocarbon, and carbon monoxide levels are comparable to national levels. At study sites where selected vegetation was exposed, damage attributable to nitrogen dioxide, ozone, peroxyacetyl nitrate, sulfur dioxide, hydrogen fluoride, and an interaction of low concentrations of these and other pollutants developed. Vegetation at the VAAP revealed damage characteristic of overexposure to nitrogen dioxide, sulfur dioxide, and acid mist. Steel and zinc corrosion rates at one VAAP site are excessive, as are dye-fading rates in the area of the plant. Silver tarnishing, the index of sulfide gas pollution; occurs at all locations in the area, but values do not exceed the National Interstate Surveillance Project upper quartile. Quantities of pollutants emitted in Hamilton County, Tennessee and Walker and Catoosa Counties, Georgia in 1968 are summarized, as is the percent contribution of all pollutants by source category. Industrial process losses are probably the most important source, followed by mobile sources and stationary fuel combustion.
APTIC-26086

NEW CUMBERLAND, WEST VIRGINIA – KNOX TOWNSHIP, OHIO – AIR POLLUTION ABATEMENT ACTIVITY.

NAPCA-Pub.-APTD-69-13, 83p., June 1969. 24 refs.
Personal Author Not Recorded.
Identifiers: *New cumberland, *West va. - knox township, *Ohio, *Area surveys, *Dust fall, Abatement, Air quality criteria, Planning and zoning, Plant damage, Health impairment, Paints, West virginia, Odors, Fly ash, Electric power production, Soiling index, Visibility, Control methods, Dispersion, Winds, Inversion, Topographic interactions, Sulfur dioxide.

Based on air quality and meteorological measurements, levels of dustfall, fly ash, and suspended particulate matter in the New Cumberland, West Virginia-Knox Township, Ohio area are excessive. Levels of sulfur dioxide, although not consistently high, reach short-term concentrations at which undesirable effects are produced. Pollution is heaviest in the area closest to a power plant, but all areas of the New Cumberland valley are affected. Topography in the valley greatly influences wind flow, limiting the ability of the atmosphere to adequately disperse pollutants. Frequent inversions, restricted lateral dispersion, and weak winds allow periods of pollutant accumulation. Undersirable effects of the pollution include reduced visibility, soiling, excessive dustfall, paint damage, vegetation damage, and irritating odors. The effect of pollution on health, as inferred by comparison of measured levels with air quality criteria, is of concern. Emissions from the power plant can be reduced by available control technology, or by the use of low-sulfur fuel combined with good combustion practices.
APTIC-26087

AIR POLLUTION: SMOKE AND SO2.

(Pollution atmospherique Fumee et SO2). Text in French. Bull. Mens. Inst. Royal Meteorol. Belgique, 1969: 22p., Jan. 1969.
Personal Author Not Recorded.
Identifiers: *Sulfur dioxide, *Smokes, *Air quality measurements, *Meuse valley, Diurnal, Monthly, Belgium, Gas sampling, Particulate sampling.

Daily pollution indexes are given in tabular and graphic form for the eight Belgian provinces and for the urban communities of Brussels, Liege, Charleroi, Gent, and Antwerp. Pollution readings include both SO2 and dust or smoke readings, both expressed in micrograms per cubic meter of air. The measuring equipment consists of an electric pump which asperates about 2 cubic meters of air per day across a paper filter, a bubbling chamber containing 50 ml of water oxygenated with hydrogen peroxide to a pH of 4.5, and gas meter. Samples are collected once a week from 230 sampling stations (100 in metropolitan areas, 100 in more sparsely populated areas, and 30 in special meteorological stations equipped with anemometers) and are analyzed by reflectometer (for dust) and acidimetric titration (for SO2) at 5 laboratories, located in the urban communities. The Brussels laboratory handles all the samples from the nonmetropolitan stations.
APTIC-26094

SURVEY OF ACTUAL CONDITIONS OF AIR POLLUTION. 1. AIR POLLUTION IN KEIHIN INDUSTRIAL AREA (1).

(Taikiosen no gittai chosa. 1. Keihin kogyo chitai no taikiosen (1)). Text in Japanese. Kanagawa-ken Taiki Osen Chosa Kenkyu Hokoku (Tech. Rept. Air Pollution Yokohama-Kawasaki Ind. Area), no. 11:6-27, Feb. 1969.
Personal Author Not Recorded.
Identifiers: *Urban areas, *Dust fall, *Soot fall, *Sulfur oxides, Annual, Yokohama, Commercial areas, Industrial areas, Residential areas.

Falling dust and soot have been measured by deposit gauges and sulfur oxides by PbO2 method since 1957 in Yokohama City and Kawasaki City in the Keihin industrial area. Results of measurements from January to December 1967 are reported. Falling dust and soot were measured in 34 districts; 26 districts in Yokohama City, and eight districts in Kawasaki City. The maximum value was 58.68 t/sq km/month, and the minimum value was 5.5 t/sq km/month; and they were less than those in 1966. Sulfur oxides were measured in 48 districts: 38 districts in Yokohama City, and 10 districts in Kawasaki City. In comparison with the results for the last year, those in Yokohama City in 1967 increased both in industrial areas and sub-industrial areas at the rates of 7.0% and 7.2% respectively. But they showed a tendency of decreasing in commercial and residential quarters at the rate of 3%. Similarly, in Kawasaki City, they were higher than in the last year in industrial areas and were less or almost the same in other areas. The mean concentration of sulfur oxides during a year in 48 districts was 4.0 mg SO3/day/100 sq cm PbO2. There were five districts where they showed higher values than the mean; the maximum mean value was 6.06 mg SO3/day/100 sq cm PbO2.
APTIC-26130

STUDIES ON REGIONAL REPRESENTATIVE VALUE OF AIR POLLUTANT.

(Taiki osen sokutei kekka no chiiki daihyochi no motomeketa ni tsuite no ichi kosatsu). Text in Japanese. Kuki Seijo (Clean Air-J. Japan Air Cleaning Assoc., Tokyo), 8 (6):38-51, Dec. 1970. 4 refs.
Y. Himi.
Identifiers: *Air quality measurements, *Mathematical analyses, Japan, Air pollution forecasting, Density.

In view of the doubtful validity of mathematical average values used to express regional air pollution, a new procedure is proposed for obtaining meaningful average values. The representative regional value is calculated from air pollution values obtained at points or stations where pollution is measured regularly or periodically. First, the distribution function should be obtained from actual measured values of air pollutants in an area. The average value is then calculated by integrating the distribution function for the area of the polluted region and the volume of polluted space. The basic formula for the average value is m equals T/F, where T is the total amount of pollutants in a particular region and F the size of the region. If air pollution is indicated in terms of density, T then stands for the total amount of air pollutants existing in the space above the regional area, while F indicates the volume of that space. If the pollution is indicated in terms of precipitation per unit area, T stands for the total amount of dust precipitation through the entire area, while F stands for the total area of the region. On the assumption that the pollution density in a given region or space changes with time, ground location, and height factors, several integral equation formulas are presented for calculating T, using a distribution function. Application of this approach to estimating average values for Yokohama and Kawasaki yielded seemingly valid results.
APTIC-26131

ATMOSPHERIC OZONE CONCENTRATION AT GROUND LEVEL, PORT AUX FRANCAIS STATION (KERGUELEN ISLANDS).

(Concentration de l'air en ozone au niveau du sol a la station de Port Aux Francais (Iles Kerguleen)). Text in French. Preprint, Faculte des Sciences de Paris (France), Lab. de Physique de L'atmosphere, 38p., 1968. 3 refs. CFSTI: N69-40731
A. Vassy.
Identifiers: *Kerguelen islands, *Ozone, *Air quality measurements, France, Pressure.

In connection with the International Geophysical Year a station for the measurement of atmospheric ozone was set up in the Kerguelen Islands, in the Indian Ocean midway between South Africa and Australia. The station is at an altitude of 14 meters above sea level. Measurements were begun in 1957, with apparatus using the conventional reaction of ozone with potassium iodide. Beginning in 1962, measurements were made of ozone partial pressures, expressed in micromillibars. The report gives the daily readings for the years 1961-1966, which are also expressed in the form of a graph. The graph indicates that ozone readings were the highest on the even-numbered years. The year

1964 gave the highest readings of all, especially between May and November. In June 1964 the monthly average of ozone partial pressure readings reached 122.41 micromillibars.
APTIC-26151

AN ARTICLE DEALING WITH SULFUR DIOXIDE EMISSIONS AND THEIR EFFECTS ON VEGETATION.

(Schwefeldioxid-Immissionsmessungen im Lande Nordrhein-Westfalen). Schriftenreihe Landesanstalt Immissions und Bodennutzungsschutz Landes Nordrhein-Westfalen (Essen), no. 13, 1968. 9 refs. Translated from German. Belov and Associates, Denver, Colo., 11p., Oct. 30, 1970.
H. Stratmann, and H. Ixfeld.
Identifiers: *Germany, *Sulfur dioxide, *Air quality measurements, Non-urban areas, Urban areas.

In accordance with the Emission Protection Law of Northrhine-Westphalia, sulfur dioxide concentrations were determined at 5280 sites from November 1, 1966 to October 1967. The measurements were evaluated with reference to variable space with the aid of an electronic data processing system. The calculated emission magnitudes for 5026 unit surface areas, each 1 sq Km in size, were tabulated and illustrated in a topographic map. In addition, the freequency of occurrence of certain loading levels was determined for individual city and rural areas of the survey district. A comparison of the results with those of two other measuring years indicates that the loading has decreased in almost all districts. This report describes special investigations conducted for the first time for the purpose of determining changes of loading with respect to time; they were conducted for the heavily industrialized Ruhr area. This evaluation variable with respect to time indicates which changes in sulfur dioxide loading in urban and rural areas of the Ruhr occurred during the course of the third survey, and that the loading in all these districts has decreased. The supervision of sulfur dioxide emissions will continue until 1968.
APTIC-26174

SMALL-SCALE VARIATIONS OF THE CONTAMINATION OF RAIN CAUSED BY WASHOUT FROM THE LOW LAYERS OF THE ATMOSPHERE.

For primary bibliographic entry see Field 05.
APTIC-26182

SULFUR DIOXIDE, SULFURIC ACID AEROSOL AND VISIBILITY IN LOS ANGELES.

Intern. J. Air Water Pollution (London), vol. 6:443-454, 1962. 16 refs. (Presented at the American Chemical Society Air Pollution Symposium, Sept. 1961 and the Air Pollution Control Association Meetings, May 1962.)
Moyer D. Thomas.
Identifiers: *Los angeles, *Visibility, *Sulfur dioxide, Eye irritation, Industrial areas, Stack gases, Oxidants, Aerosols, Smog, Fuel oils, Winds, Inversion, Sulfuric acid, Oxidation.

An automatic analyzer for simultaneously recording sulfur dioxide and sulfuric acid aerosol was used to monitor the Los Angeles atmosphere. In downtown Los Angeles, when the base of the inversion ceiling and wind speeds were low and oxidants high (Rule 57 days), the oxidation of sulfur dioxide to sulfuric acid was maximal. Acid levels reached 5-20% of the total sulfur with sulfur dioxide levels of 5-20 pphm. Percentage oxidation of sulfur dioxide decreased with increasing SO2 concentration above 5-10 pphm. In industrial El Segundo, the rate of oxidation of sulfur dioxide was about 60% of the rate downtown under similar weather conditions. Presumably the accompanying smog concentrations were also lower in El Segundo. Visibility in areas immediately downwind from large consumers of fuel oil was reduced slightly on Rule 57 days by burning oil containing 1-5% sulfur instead of natural gas; no effect was found at greater distances. Eye irritation downtown was independent of the amount of fuel oil burned. (Author abstract modified)
APTIC-26216

AIR POLLUTION AND ASSOCIATED HEALTH HAZARDS FROM DIESEL LOCOMOTIVE TRAFFIC IN A RAILWAY TUNNEL.

For primary bibliographic entry see Field 01.
APTIC-26262

ENVIRONMENT IN YAMAGUCHI PREFECTURE.

(Yamaguchi-Ken no Kogai). Text in Japanese. p. 41-65, June 1970.
Personal Author Not Recorded.
Identifiers: *Yamaguchi prefecture, *Air quality measurements, Annual, Japan, Residual oils, Dust fall, Winds, Sulfur oxides.

Three areas are designated by the prefectural authority for air pollution: Ube-Onoda area, Tokuyama-Nanyo area, and Iwakuni-Wagi area. The average values of concentration of sulfur oxide in a year at the Ube-Onoda area were 0.022 ppm (1966), 0.022 ppm (1967), 0.032 ppm (1968), and 0.046 ppm (1969). Air pollution showed a yearly increase, making rapid progress in 1969. When the strong wind blew from the west, the concentration of pollution became high and it occurred locally. As the wind changed its direction, the polluted area changed. Dust fall in this area was on the decrease year by year until around 1966; recently it has been increasing gradually. At Tokuyama, the pollution by sulfur oxides has increased annually since 1966, but the value, 0.033 ppm (in 1969), remains on the same from 1968; at Nanyo area, an increasing tendency is seen. Dust fall was considerably higher in Kudamatsu area than those of the other two areas, though no sufficient data to prove the fact has been obtained. In these areas, the high dust fall is seen in the daytime when it blows from the sea (south-west or north-west wind) or in such stable atmospheric conditions as windless or feeble wind. The pollution occurs over a comparatively wide area. Dust fall at Tokuyama area remains on the same level in these years, but that at Nanyo area has increased rapidly. In Iwakuni-Wagi area, the concentration of sulfur oxide pollution was lower than that in Ube area; it was the same level as that in Tokuyama area. Dust fall was lowest in Iwakuni-Wagi area among these three areas. The consumption of heavy oil increased 25% in Ube-Onoda area and Tokuyama-Nanyo-Kudamatsu area and six % in Iwakuni-Wagi area compared with that in 1968.
APTIC-26281

ON THE TYPE OF AIR POLLUTION OF MIZUSHIMA, OKAYAMA PREFECTURE.

(Okayama-ken Mizushima-chiku ni okeru taiki osen patan). Text in Japanese. Okayama-Ken Eisei Kenkyusho Nenpo (Ann. Rept. Hyg. Lab. Okayama Prefect.), no. 16:99-107, March 1969.
Norikatsu Hamamura, Ayamichi Shigeta, Yoichi Takaya, and Hirokatsu Okada.
Identifiers: *Mizushima, *Seasonal, *Air quality measurements, Japan, Urban areas, Winds, Sea breeze, Sulfur dioxide.

Summer type air pollution appearing mainly at Mizushima area, Okayama prefecture and winter type air pollution at the neighboring areas to factories were analyzed. Research on air pollution at Mizushima, Kurashiki city, at the southern part in Tamashima city (old name) and at the north-western part in Kojima city (old name), neighboring to Mizushima, was conducted in summer from 1965 to 1968. The measured points were on the coaxial circles with the radii of 3 km and 5 km, the origin of which was near the center of main existing pollution sources. These points were chiefly scattered in the area where the effects by south-west or south-south-west wind were expected. Sulfur dioxide at these points was measured using the electroconductivity method and p-Rosaniline method. When wind blew from south-south-west or south-west, remarkable air pollution was seen at Fukuda area. Air pollution status of these areas is getting worse rapidly year by year. When winds blow from south or south-south-west, air pollution sources of seaside factories form a line; at one particular point, high concentration of pollution was shown, while the points in a little different direction showed non-pollution. The calculated value of the concentration of SO2 at one point with a high concentration of air pollution (using diffusion formula based on the actual data of weather conditions and of pollutant emission conditions from 0 - 3 pm on June 6, 1969) agreed well with the observed value. There were remarkable differences, however, between the observed value and the existing data about the concentration of pollution under the same conditions. From February 4 to 7, 1969, the distribution of the concentration of SO2 at the eastern part in Mizushima area was determined. When the seasonal wind from west was comparatively weak, the degree of pollution was more than 0.1 ppm. When it blew from the sea, (weaker than the seasonal wind), the lee side of factories was polluted because of the resultant direction of west-south-west winds.
APTIC-26282

RESEARCHES ON AUTO EXHAUST GAS POLLUTION AND TRAFFIC NOISES IN TOKUSHIMA CITY. PART I.

(Tokushima shinai ni okeru jidosha haiki gasu ni yoru kankyo osen oyobi kotsu soon jittai chosa ni tsuite. Dai 1 po). Text in Japanese. Tokushima-Ken Eisei Kenkyusho Nenpo (Ann. Rept. Tokushima Prefect. Public Health Lab.), no. 8:1-8, March 1969. 5 refs.
Cho Matsuoka, Toshio Kitamura, Isao Tahara, Heiichiro Kondo, and Shigeyuki Bando.
Identifiers: *Tokushima, *Streets, *Air quality measurements, Diurnal, Seasonal, Japan, Urban areas, Engine exhausts, Dusts, Automobiles, Winds, Humidity, Temperature (atmospheric), Carbon monoxide.

Automobile exhaust gas pollution and traffic noises were studied at five chief intersections of streets in Tokushima city; samples were taken twice a day, 8 - 9 am and 0 - 1 pm, from August 19 (Mon.) to 23 (Fri.), 1968. Traffic flow by types of vehicles, temperature and humidity using Assmann's aspiration psychrometer, wind direction and speed using Vyram type wind vane and anemometer, carbon monoxide using Kitagawa's detector meter (c type), dust using digital dust meter, and noise using portable indicating noise meter were measured. In the morning, the maximum concentration of carbon monoxide was 18.6 ppm; in the daytime, it was 0 - 4 ppm, depending on traffic volume, wind speeds, or geographical conditions. Carbon monoxide from exhaust gas by operating vehicles at the condition of traffic jams is considered the highest pollution source. The same tendency as that of carbon monoxide was seen with dust, which was more than 1 mg/cu m at the intersection of streets where traffic jams occurred. The degree of noise was 78 - 75 phones (4000 of traffic flow /hour) at 8 - 9 am and about 70 phones (2000 - 3000 of traffic flow /hour) at 0 - 1 pm. A correlation was observed between the noise-level and the logarithm of traffic volume. As the research was carried out in midsummer, it is necessary to also study winter, the conditions of which are different from those in summer.
APTIC-26284

'THE WEEK OF DRUG AND HEALTH' IN 1969. REPORT ON THE INVESTIGATION OF PUBLIC NUISANCE BY TRAFFIC IN BIG CITIES IN JAPAN.

(Showa 44 nendo 'kusuri to kenko no shukan'. Zenkoku shuyo toshi kotsu kogai chosa hokoku). Text in Japanese. Nippon Yakuzaishikai Zasshi (J. Japan Pharm. Assoc.), 22 (6):55-67, June 1970.
Personal Author Not Recorded.

Identifiers: *Urban areas, *Air quality measurements, *Carbon monoxide, Diurnal, Japan, Vehicles, Dust fall.

Carbon monoxide, dust fall, noise, and traffic volume were measured every two hours from 8 am to 5 pm, totaling 1634 measurements at 363 test points in 254 cities, towns, and villages throughout Japan. The above cities, towns, and villages were classified into four groups according to their population: (I) less than 50,000, (II) 50,000 - 200,000, (III) 200,000 - 500,000, and (IV) more than 500,000. Carbon monoxide was measured by the detection tube method, dust by the filter paper method, noise by a simple noise meter, and traffic volume by the number of cars going up and down the streets. A day's average within CO's 90% range are as follows: (I), 4.7 ppm; (II), 6.5 ppm; (III), 8.1 ppm; and (IV), 9.6 ppm. In group (IV), the level was near 10 ppm, the environmental standard level of CO. The CO level was high in the cities having large populations and a high level was recognized in the morning and evening. A day's average of dust fall was as follows: (I), 0.086; (II), 0.117; (III), 0.132; and (IV), 0.114. The amount of dust fall was generally high in the morning; however, it was not so high in Group (IV) where it showed little change through a day. The median recorded high noise was in cities having large populations; as to their highest levels, the association with population was not clear. Traffic volume was closely related to the population and recorded as follows: (I), 133.5; (II), 217.4; (III), 363.3; and (IV), 475.6.
APTIC-26286

RESEARCH ON THE ACTUAL CONDITION OF AIR POLLUTION. 4. INVESTIGATION OF AIR POLLUTION CAUSED BY AUTOMOBILE WASTE GASES IN THE SEISHO NATIONAL HIGHWAY.

(Taiki osen no jittai chosa. 4. Seisho kokudo ni okeru jidosha haiki gasu ni yoru osen no chosa). Text in Japanese. Kanagawa-Ken Taiki Osen Chosa Kenkyu Hokoku (Tech. Rept. Air Pollution Yokohama-Kawasaki Ind. Area), no.11:41-60, Feb. 1969. 14 refs.
Personal Author Not Recorded.
Identifiers: *Highways, *Automotive emissions, *Air quality measurements, Japan, Urban areas, Automobiles, Lead compounds, Carbon monoxide, Nitrogen dioxide (no2).

In 1967, the determinations of carbon monoxide, nitrogen dioxide, and lead in the air were done twice on October 24 and November 7, in order to study air pollution caused by automobile waste gases along the national highway and the Seisho by-pass of the national highway in Oiso and Ninomiya areas in Kanagawa. The detector tube method for carbon monoxide, and the Saltzman method and the alkali filter paper method for nitrogen dioxide were used. The polarographic method and the dithizone carbon tetrachloride method were used for lead after collecting lead on filter paper using the high-volume air sampler and dissolving it into nitric acid. The value of carbon monoxide on the national highway, 30 ppm (maximum), was higher than that of the Seisho by-pass, 15 ppm (maximum). The traffic on the national highway in the Ninomiya area was heavy, and the concentration of carbon monoxide there was higher than that of Oiso area. Judging from the diffusion of carbon monoxide from the national highway to its branch-roads in the Ninomiya area, the influential range was considered to be around 20 m or so. The pollution caused by automobile waste gas was the road-side air pollution. With respect to lead, 0.37 - 2.8 micrograms/cu m were detected along the national highway and the Seisho by-pass. In this case, the value of the latter was higher than that of the former. The maximum value of nitrogen dioxide using Saltzman method was 0.036 ppm. In the urbanized areas of Kawasaki and Yokahama cities, the maximum values in both areas had been determined as more than 0.1 ppm, and every value measured this time fell far short of those values. The reason why the air remains comparatively clear may depend on the fact that the Seisho by-pass is located in an opening area of seaside. The close relationships between the concentration of nitrogen dioxide and the traffic volume was estimated from the results of measurement using alkali filter paper methods.
APTIC-26287

ON AIR POLLUTION OF MITSUISHI-TOWN, BIZEN-TOWN AND TAMANO-CITY, OKAYAMA PREFECTURE.

(Mitsuishi-cho, Bizen-mashi oyobi Tamano-shi ni okeru taiki osen). Text in Japanese. Okayama-Ken Eisei Kenkyusho Nenpo (Ann. Rept. Hyg. Lab. Okayama Prefect.), no. 16:134-139, March 1969.
Naoji Kitamura, Norikatsu Hamamura, Ichiro Torii, Tadashi Moriwake, and Shogo Ichikawa.
Identifiers: *Air quality measurements, *Sulfur dioxide, Japan, Urban areas, Industrial areas, Valleys, Dust fall, Topographic interactions.

Air pollution in Mitsuishi-town, Bizen-town, and Tamano-city, Okayama Prefecture was investigated for two days in 1968 and 1969. Sulfur dioxide was gathered by air samplers and was analyzed by pararosaniline method; floating dust was gathered by high volume samplers and was analyzed in accordance with National Air Sampling Network. Firebrick factories and general private houses were massed in the small basin of Mitsuishi-town, and waste gases would stay in the basin so that the atmosphere would become bad, as factory chimneys were low. The range of mean value of sulfur dioxide concentration was 0.004 - 0.06 ppm; the amounts of floating dust showed a high figure of 566 micrograms/cu m in some points because of the utilization of coals in factories. Firebrick factories were gathered in Bizen-town and it seemed that they were mostly sources of smoke. The amount of floating dust was about 210 micrograms/cu m; the amount of sulfate ion was rather high and was 35.8 - 38.8 micrograms/cu m; and mean concentration of sulfurous dioxide was 0.001-0.200 ppm. There was a refinery at Hibi area, Tamano-city, and the mean concentration of sulfur dioxide was recorded rather high at 0.434-0.032 ppm, but this was investigated under the influence of a typhoon, so that the result did not represent the satisfactory actual condition of this area.
APTIC-26288

STUDIES ON PUBLIC NUISANCE CAUSED BY AIR POLLUTION. 2. AIR POLLUTION IN TAJIMI CITY.

(Kogai ni kansuru kenkyu. Dai 2 ho Tajimi-shi no taikiosen). Text in Japanese. Gifu Yakka Daigaku Kiyo (Ann. Proc. Gifu Coll. Pharm.), no. 19:1-7, Nov. 1969. 4 refs.
Youki Ose, Taira Ikeda, Youko Tanaka, and Tadashi Usui.
Identifiers: *Tajimi, *Air quality measurements, *Nitrogen dioxide (no2), *Sulfur trioxide, Diurnal, Seasonal, Ceramics, Japan, Urban areas, Commercial areas, Industrial areas, Residual oils, Mineral processing, Winds.

The condition of air pollution in Tajimi City, Gifu Prefecture, was investigated by determining the air pollution by sulfur oxides and nitrogen oxides accompanying the change in fuel to heavy oil in the chinaware industry, which is a central industry in the city. Five points in the city were chosen for measurement from August 1963 to July 1964. The meteorological data of a fire station were used; the wind distribution curve was determined by the total of the observational figures of 24 times a day (every hour) for the period which was suitable for the period of the exposure of alkali filter paper. There were 0.22-0.72 mg SO3/day/100 sq cm in Takiro-cho, industrial area, with an average of 0.48 mg SO3/day/100 sq cm which was high; figures were high in September, October, and January. There were 0.040-0.120 mg NO2/day/100 sq cm in Hirokoji, commercial area, with an average of 0.077 mg NO2/day/100 sq cm, which was the highest; figures were high in winter seasons, December to March. The average wind velocity was 1.8 m/sec during the period of the measurement. The amounts of nitrogen oxide were generally higher in each measurement point in comparison with the observational figures on and after May, 1964 as previously reported.
APTIC-26289

AIR POLLUTION.

(Taikiosen). In: Annual report of countermeasures for public nuisance in Tokuyama City. (Kogai taisaku nen-po). Text in Japanese. p. 2-23, Oct. 1969.
Personal Author Not Recorded.
Identifiers: *Tokuyama, *Air quality measurements, Annual, Diurnal, Monthly, Japan, Urban areas, Residual oils, Stacks, Dust fall, Soot fall, Sulfur dioxide.

In order to investigate air pollution in Tokuyama City of Yamaguchi Prefecture, the concentration of floating and falling dust and soot and sulfur dioxide gas were estimated for nine years from 1960 to 1968. Falling soot and dust and SO2 (by PbO2 method) were measured at five points in the city; SO2 was also measured by electroconductivity method at one point from 1964, and floating soot and dust were measured by permeability method. The mean value of floating soot and dust at five points showed the maximum, 12.2 t/sq km/month in 1961, and it tended to decrease since then. But it showed the tendency to increase from 1967 to 1968, and was 9.6 t/sq km/month in 1968, as compared with the value of 9.3 t/sq km/ month in 1967. The same tendency occurred for SO2, the concentration of which reached the maximum in 1963 (mean value was 0.59 mg/100 sq cm PbO2/day), and decreased after that. But it showed 0.52 mg/100 sq cm Pb02 in 1968, as compared with the value of 0.42 mg/100 sq cm PbO2/day in 1966. By electroconductivity measurements, it showed the upward tendency recently, and the value was 0.035 ppm in 1968. The concentration of floating soot and dust (inverse value of permeability) tended downward, and the value was 6.6% in 1966. Thus, air pollution in Tokuyama City reached the maximum from 1961 to 1963 and decreased since then, but it has shown the tendency upward for the last few years. The ratio of SO2 level and amount used of heavy oil for fuel in the main factories decreased year by year, and the increasing amount of heavy oil used was not so much as the increase of SO2 level in the air. It seemed that it resulted from the effect of tall chimneys.
APTIC-26290

AIR POLLUTION.

(Taikiosen). In: Present Condition of Air Pollution and its Countermeasure in Osaka City. (Osaka-shi no kogai no genkyu to sono taisaku. 45 nenban). Text in Japanese. p. 2-34, Oct. 1970.
Personal Author Not Recorded.
Identifiers: *Osaka, *Air quality measurements, Abatement, Education, Legislation, Public information, Air quality standards, Annual, Japan, Urban areas, Commercial areas, Industrial areas, Engine exhausts, Smog, Coal, Residual oils, Automobiles, Dust fall, Soot fall, Carbon monoxide, Sulfur oxides.

The transition and present condition of air pollution, the status of pollution by automobile exhaust gases, and countermeasures for them are reported. During the past 11 years, falling soot and dust amounts reached the peak in 1960, and have tended to decrease gradually since then. The tendency of decrease was significant in the industrial areas. The level of sulfur oxides (PbO2 method) showed the tendency to decrease by degrees since 1969, possibly due to the change of fuel from coal to heavy oil. The number of days of the outbreak of smog showed a maximum in 1960 and has tended to decrease since then, which agrees comparatively with the changes of falling soot and dust. The distribution of falling soot and dust showed differences by regional groups; in the areas comparatively limited, the level of falling soot and dust was high. In general, it showed high

in the western seaside industrial areas and the central commercial districts. The level of sulfur oxides (PbO2 method) showed high in the western seaside industrial areas in 1969. When measured by the electroconductivity method at 11 points in the cities during the period from 1966 to 1969, the results did not satisfy the standard value for the environment as determined by the government in February 1968. The degree of pollution by automobile exhaust gas, especially by carbon monoxide, was about 5 ppm. There were about 10 days in a year when the level of carbon monoxide showed more than the standard value determined in the Cabinet council in February 1970. For the countermeasure of air pollution in Osaka City, regulation by laws, public teaching and administrative guidance, smog information and its urgent treatment, constant supervision of air pollution, prevention of automobile exhaust gas, survey of air pollution, and enforcement of environment standard achievement plan for air pollution were reported.
APTIC-26293

EVALUATION OF AIR POLLUTION IN THE VALLE DE MEXICO.

(Evaluacion de la contaminacion del aire en el
Valle de Mexico). Text in Spanish. Preprint,
International Union of Air Pollution Prevention
Associations, 14p., 1970. (Presented at the
International Clean Air Congress, 2nd,
Washington, D. C., Dec. 6-11, 1970.)
E. Marquez-Mayaudon.
Identifiers: *Air quality measurement programs, *Mexico city, Urban areas, Suspended particulates, Air quality measurements, Dust fall, Measurement methods, Aldehydes, Nitrogen oxides, Nitrogen dioxide (no2), Sulfur dioxide, Ozone, Hydrogen sulfide.

A report is given on the materials and methods employed by the Environmental Hygiene Administration of the Mexican government in the identification and quantitative analysis of certain pollution indicators, and data obtained from 10 sampling stations set up in the vicinity of Mexico City, beginning in August of 1967, when the first station was set up. Stations were gradually added, number 10 beginning operation in January 1970. All of the stations are equipped for sampling dust fall, suspended dust, and sulfur dioxide. Station 1 also conducts periodic analyses of nitrogen oxides, aldehydes, ozone, and hydrogen sulfide. Stations 1-6 have recently been testing the oxidation of steel samples with a total exposed surface of 68.4 square centimeters each. Sulfur dioxide is measured from the reaction of dilute hydrogen peroxide with a pH of 4.5. The amount of sodium tetraborate solution that must be added to the exposed peroxide to restore the original pH is the mathematical basis on which the SO2 concentration is calculated in micrograms per cubic meter. The sulfur dioxide and nitrogen dioxide figures for Mexico City in 1968 and 1969 are compared with those of Chicago, Los Angeles, Philadelphia, and Washington for the years 1962-1964, where available. Some problems in statistical analysis are created by the fact that the stations have been run for different periods of time, that methods and instruments have been changed in some cases, and that revisions have been made in the mathematical formulas used to calculate results.
APTIC-26297

ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE. (II).

(Okayama-shi ni okeru taiki osen. (II)). Text in
Japanese. Okayama-Ken Eisei Kenkyusho Nenpo
(Ann. Rept. Hyg. Lab. Okayama Prefect.), no.
16:125-133, March 1969. 1 ref.
Naoji Kitamura, Norikatsu Hamamura, Ichiro
Torii, Tadashi Moriwake, and Shogo Ichikawa.
Identifiers: *Okayama, *Suspended particulates, *Air quality measurements, *Sulfur dioxide, Annual, Diurnal, Monthly, Seasonal, Japan, Urban areas.

Suspended particulate matter was measured by deposit gauge method and sulfur dioxide by lead dioxide method in five test points in Okayama City from January 1968 through December 1969. The results of the measurement and their annual changes are presented. Suspended particulate matter is decreasing yearly except for one test point, but no great changes were recognized, recording 3 - 6 t/sq km/month; geographical or seasonal changes were not seen. The average SO2 for 1967 was 0.4 SO3 mg/100 sq cm/day; but in 1968, the average was 0.7 mg, showing an extreme increase. The same tendency was seen in the five test points mentioned above. A high level of 1.07 mg was recorded from May to July (1968), and a low level of 0.5 mg from September to November. Moreover, the same test was carried out for two days in July, 1968 at Saidaiji Kosai region where a titanium factory is located. Sulfur dioxide recorded 0.53 ppm/hour in one place; at many places, the average exceeded 0.1 ppm. Drifting dusts totaled 664.1 and 405.3 micrograms/sq m.
APTIC-26302

A TENTATIVE PLAN CONCERNING A COMPREHENSIVE ASSESSMENT OF ENVIRONMENTAL POLLUTION.

(Kankyo osen no sogo hyoka ni kansuru ichi
shian). Text in Japanese. Koshu Eisei (Public
Health), 34 (9):563-572, Sept. 1970. 17 refs.
Konosuke Nishida, Yoshinori Ishikawa, Takashi
Suzuki, Masaichi Sasaki, and Junichi Ueda.
Identifiers: *Kyoto, *Mapping, *Air quality measurements, Materials deterioration, Japan, Urban areas, Odors, Dust fall, Soot fall, Carbon monoxide, Nitrogen oxides, Sulfur oxides.

A tentative plan, for assessing factors which adversely affect the environment of Kyoto city involved dividing it into 404 evaluating zones and measuring environmental contaminants in each area to assess the level of pollution. The measured values were classified into 5 grades for each of 7 contaminant factors (noise, sulfur oxides, nitrogen oxides, carbon monoxide, bad odor density 5, soot and dust, and the density of factories) which seemed to adversely affect the situation, and an assessment was correspondingly made for each grade. Questionnaires distributed to citizens were analyzed; the weighting coefficients which reflected the various degrees of influence of the seven contaminant factors on the living conditions in each zone were calculated. A comprehensive, overall value was computed by multiplying the measured levels of contaminants by their respective weighting coefficients and by summing up seven measured points in each zone. The comprehensive values derived in this way were further classified into 5 grades, and assessments which corresponded with each grade were given. The quantitative degree of contamination for each zone were plotted on a map of Kyoto city giving an overall distribution of pollution. As a result, the living conditions were shown to have deteriorated most seriously in 3 sections of Nishijin, Kamigyo-ku and the whole of Kawaramachi, and Nakagyo-ku; 5 areas of Minami-ku and the east of Sakyo-ku; and 2 areas of north of Fujimi-ku. The conditions were best in the western parts of Kita-ku, Sakyo-ku, and Ukyo-ku and the southwest of Fushimi-ku. Compared with the distribution of areas where environmental pollution complaints arise, the map giving the overall assessments for Kyoto city shows that the former are generally located where conditions have deteriorated. The comparison reveals a generally close correspondence between the areas where complaints arise and those worst affected according to the comprehensive, overall grading.
APTIC-26304

STUDIES ON AIRBORNE FUNGAL FLORA. PART II. STUDY ON AIRBORNE FUNGI IN REFERENCE TO ATMOSPHERIC FACTORS AND AIR POLLUTION.

(Kuchu shinkinso ni kansuru kenkyu. Dai 3 hen.
Kuchu shinkin to kishojyoken narabini taikiosen
tono kanren ni tsuite). Text in Japanese. Kobe-Shi
Eisei Kenkyusho Nenpo (Ann. Rept. Public
Health Res. Inst. Kobe City), no. 8:k60-k71, 1969.
21 refs. (Also: Kansai Ika Daigaku Zasshi, 21
(4):558-569, Dec. 1969.)
Yoshio Matsuda.
Identifiers: *Fungi, *Air quality measurements, Monthly, Japan, Suspended particulates, Winds, Humidity, Rain Temperature (atmospheric), Sulfur dioxide, Solar radiation, Vapor pressure.

In order to find out the incidence of fungal colonies in reference to atmospheric factors and air pollution, numbers of fungal colonies, weather, temperature, humidity, wind direction, wind speed, suspended particulate matter, and sulfur dioxide were measured from April 1, 1966 through April 22, 1966. Suspended particulate matter was measured by applying the Air Pollution Automatic Sampler and Tape Air Sampler. For measuring sulfur dioxide, the rosaniline formalin method was applied. Numbers of fungal colonies increased in fine or cloudy days but decreased when it rained the previous day or at midnight. The number of fungal colonies per month was positively associated with temperature, humidity, amount of precipitation, amount of evaporation, and vapor pressure. However, there seemed to be no positive association between numbers of fungal colonies and rate of sunshine. There was an inverse association between numbers of fungal colonies and wind speed; numbers of fungal colonies decreased when wind speed was high. Numbers of fungal colonies were positively associated with air pollution substances: they increased when levels of suspended particulate matter and sulfur dioxide were high and decreased when the levels were low. Fungal colonies are intermediated by atmospheric factors and indirectly associated with air pollution.
APTIC-26307

AN INTERIM REPORT ON THE INVESTIGATION OF PUBLIC NUISANCE BY LEAD.

(Namari kogai chosa chukan hokoku). Text in
Japanese. 62p., Sept. 1970.
Personal Author Not Recorded.
Identifiers: *Streets, *Air quality measurements, *Lead compounds, Humans, Hematology, Urinalysis, Blood cells, Metal poisoning, Tokyo, Urban areas, Carbon monoxide.

Concentration of lead was measured for three to nine days, in and around seven crossroads of Tokyo during the period from May to August, 1970. Floating micro-particles in the air were collected in filters such as glass fibers, and the content of lead was determined by atomic absorption spectrometry. When the mean concentration of lead was taken as 100 on the crossroads, it showed the value of 86 (in the range of 47-121) by the roadside which was 100 m from the crossroads. At the back points of the crossroad, 50-100 m from the road, it was as low as 38 (20-58), though there was no correlation between the concentrations on the crossroad and those in the other places. Concentration of carbon-monoxide was significantly correlated with that of lead. In 700 subjects of six districts, including six points of the above mentioned seven points, contents of lead in the blood and the urine, coproporphyrin in the urine, and basophilic erythrocyte were measured. The content of lead was below 30 micrograms/100 ml blood in 99% of the subjects. Only two subjects showed above 80 micrograms/l (the value was 81 and 88 micrograms/l respectively) in urine analysis but other subjects showed below 30 micrograms/l. In the results of urinary coproporphyrin tests, there were 16 subjects who showed more than 120 mg/l of the substance. In the results of the test for basophilic erythrocyte, only one subject showed a value of more than 30/10000 erythrocytes; others showed below 5/10000 erythrocytes. In this case, other results were normal, so it was suggested that the high value of basophilic erythrocyte was not attributed to lead poisoning. In all cases, there was no clear difference in the blood and urinary tests among regional or residence groups, that is, whether the house stood by the road or not.
APTIC-26310

ATMOSPHERIC POLLUTANTS; RESULTS TO DATE OF STUDIES CONDUCTED IN THE CITY OF BUENOS AIRES.

(Los contaminantes atmosfericos; estado actual de los estudios realizados en la ciudad de Buenos Aires). Text in Spanish. Semana Med. (Buenos Aires), 136 (38):1361-1371, June 18, 1970. 17 refs.
Manuel A. Gentelli.
Identifiers: *Buenos aires, *Air quality measurements, Urban areas, Particulates, Fuel oils, Meteorology, Polynuclear compounds, Carbon monoxide, Nitrogen oxides, Sulfur dioxide.

A summary is given of the properties and effects of carbon monoxide, sulfur dioxide, nitrogen oxides, aromatic polynuclear hydrocarbons, and particulates, together with comments on local meteorological problems, the principal sources of pollution, the mathematical risk involved, and measures for prevention. Recent tests have shown that exposure to an atmosphere containing 30 ppm of carbon monoxide for a period of 4-6 hours produces harmful effects equivalent to those experienced by heavy smokers. The urban atmosphere has a CO concentration of 70-90 ppm. Argentine petroleum is for the most part of a low sulfur content, ranging from 0.19 g % to 0.53 g %. This compares with 1% for Venezuelan oil, 2.5% for Colombian oil, and 2% for oil of Arabian origin.
APTIC-26311

5. ATMOSPHERIC INTERACTIONS

ATMOSPHERIC TURBIDITY OVER THE UNITED STATES, 1961-1966.

Preprint, National Air Pollution Control Administration, Washington, D. C., Div. of Meteorology, 30p., 1968 (*). 23 refs.
E. C. Flowers, R. A. McCormick, and K. R. Kurfis.
Identifiers: *Turbidity, *United states, Annual, Seasonal, Dusts, Photometric methods, Turbidimetry, Clouds, Vapors, Haze.

If there are no clouds between an observer and the sun, the intensity of direct solar radiation for a given solar elevation depends on the variable amount of dust, haze, and water vapor in the atmosphere. The extinction produced by these constituents is called atmospheric turbidity. Five years of turbidity measurements from a network of stations in the United States are analyzed. Measurements are made with the Volz sun-photometer; the instrument, its calibration, and its use are described. The relationship of these measurements to those of Linke and Angstrom is briefly discussed. Analysis of the data indicates the following: an annual mean pattern of low turbidity (near 0.05) over the western plains and Rocky Mountains and high turbidity (near 0.14) in the east; observed minimum turbidity near 0.02; an annual cycle of low turbidity in winter and high in summer; lowest turbidity in continental polar air masses and highest in maritime tropical; no noticeable lowering of turbidity following precipitation. (Author abstract)
APTIC-12595

SYSTEMS STUDY FOR CONTROL OF EMISSIONS. PRIMARY NONFERROUS SMELTING INDUSTRY. (FINAL REPORT). VOLUME III: APPENDICES C THROUGH G.

For primary bibliographic entry see Field 02.
APTIC-12777

THE APPLICATION OF TURNER'S CLASSIFICIATION OF DIFFUSION CATEGORIES TO CENTRAL EUROPEAN CLIMATES.

(Zur Anwendung der Turner'schen Klassifizierung der Diffusionskategorien in der mitteleuropaeichen Klimaregion).
Kernforschungsanlage, Juelich (West Germany), Zentralabteilung Strahlenschutz Internal Rept. 9, 16p., 1969. 11 refs. Translated from German. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 19p., Aug. 26, 1969.
G. Polster.
Identifiers: *Europe, *Diffusion models, Annual, Diurnal, Seasonal, Germany, Lower atmosphere, Winds, Clouds, Stability (atmospheric), Solar radiation.

Turner's classification system for dispersion categories was developed to deal with questions of air pollution. It is based on hourly cloud observations conducted by weather bureaus on the radiation intensity figured out indirectly from the annual and diurnal variation of the sun elevation and on measurements of the wind speed. The system is built around the idea by Pasquill, according to which the atmospheric stability near the earth's surface is primarily a function of solar or terrestrial radiation proportional to the degree of cloudiness and the depth of the cloud layer. By including the amount of clouds and the height of the cloud layer, radiation changes are to some extent reflected by the system. The method can be programmed and fed into a computer. This method is applied to central European climates, and the results of the application are discussed.
APTIC-12792

A STATISTICAL STUDY ON VISIBILITY FORECASTING (PART I).

Kenkyu Jiho (J. Meteorol. Res.), 20 (12):1-16, Dec. 1963. 7 refs. Translated from Japanese. Franklin Inst. Research Labs., Philadelphia, Pa., Science Info. Services, 35p., Dec. 19, 1969.
S. Nomoto, and K. Enoshima.
Identifiers: *Visibility, *Statistical analyses, *Weather forecasting, Japan, Aerosols, Dust fall, Air pollution forecasting, Lower atmosphere, Winds, Clouds, Humidity, Precipitation, Pressure (atmospheric), Temperature (atmospheric), Inversion.

A method for objective forecasting of visibility by means of statistics and correlative analysis is described. Visibility predictors and correlative coefficients are calculated for minimum visibility in the evening and averaged for days with or without rainfall. Useful predictors with high correlation coefficients, such as meso-scale pressure pattern, atmospheric stability, and wind velocity in the lower atmosphere are selected. By combining these, some forecasting diagrams are constructed. The forecasting method by these diagrams is verified as useful; minimum visibility in the morning and evening can, in general, be predicted within an error of 1.5 miles. The method considers industrial pollution in the form of volume and variation of aerosols. Other parameters considered include cloud cover, dust-fall, precipitation, temperature, pressure, humidity, winds, and inversions. (Author abstract modified)
APTIC-22403

THE NATIONAL AIR POLLUTION POTENTIAL FORECAST PROGRAM.

Weather Bureau, Washington, D. C., National Meteorological Center, ESSA-TM-WBTM NMC 47, 18p., May 1970. 19 refs. CFSTI: WBTM NMC 47
Edward Gross.
Identifiers: *Air pollution forecasting, Advisory services, Alerts, Federal governments, Diurnal, Data handling systems, Transport, Meteorology, Winds, Weather forecasting, Stagnation.

Air Pollution Potential (APP) is defined as a measure of the inability of the atmosphere to adequately dilute and disperse pollutants emitted into it based on values of specific meterological parameters of the macroscale features. To delineate areas on the macroscale in which high APP has the greatest probability of occurring, a stagnation index was developed independent of mixing height and transport wind speed data. The associated stagnation conditions are usually manifested by stable stratification, weak horizontal wind speed components and little, if any, significant precipitation. The numerical and subjective means by which stagnation areas are delineated and mixing height and transport wind speed calculated are described, as well as the means by which high APP conditions are transmitted to our users via facsimile and teletypewriter. The data depicted on the facsimile product will be the basis of the National Meteorological Center's National Air Pollution Potential Advisory. In addition, the daily facsimile and teletype transmissions should increase the confidence level among Weather Bureau field office forecasters and other users in preparing local statements of high air pollution potential. The resulting program is a joint effort of the Development Division of the National Meteorological Center and the Division of Meteorology of the National Air Pollution Control Administration (NAPCA).
APTIC-23790

THERMODYNAMIC CONSIDERATIONS IN THE INTERACTIONS OF NITROGEN OXIDES AND OXY-ACIDS IN THE ATMOSPHERE.

Preprint, Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio, 16p., 1956 (*). 16 refs.
Aubrey P. Altshuller.
Identifiers: *Nitrogen dioxide (no2), *Thermodynamics, Nitric acid, Nitrous acid, Nitric oxide (no), Nitrous oxide (n2o), Ozone, Photolysis, Reaction kinetics, Reaction mechanisms.

The thermodynamic equilibrium constants are computed for a number of chemical reactions involving nitrogen oxides and oxy-acids. The nitrogen oxides likely to be present in any substantial quantity in the atmosphere are nitrous oxide, nitric oxide, and nitrogen dioxide. The concentrations of reactants and products in these reactions at chemical equilibrium are given, and the rates at which these reactions proceed towards equilibrium are discussed. Most of the reactions considered are 'dark' reactions, but the importance of photochemical reactions involving ozone is pointed out and the photolysis of nitrogen dioxide is discussed in detail. The varying importance of the individual reactions of nitrogen oxides in air pollution problems is emphasized. (Author abstract modified)
APTIC-24015

PENETRATION OF AN INVERSION LAYER BY AN INDUSTRIAL CUMULUS.

(Penetration d'une couche d'inversion par un cumulus industriel). Text in French. Intern. J. Air Water Pollution (London), vol. 8:151-157, 1964. 6 refs.
R. Serpolay.
Identifiers: *Lofting, *Inversion, France, Stack gases, Lower atmosphere, Plume behavior, Convection (atmospheric), Condensation (atmospheric).

A cumulus cloud produced by an industrial source of hot gas of known output developed below an inversion layer that extended upward from 100 m. When the cloud reached its maximum development, its summit had penetrated the base of the inversion by 300 m. Thus, part of the pollution from the source was carried into the inversion layer instead of being trapped. Because of the simultaneous behavior of neighboring ordinary cumulus clouds, it is considered unlikely that condensation processes alone were sufficient to cause the observed penetration. Shearing of the industrial cumulus cloud occurred only after the emission of hot gas ceased. This and other observations are typical phenomena of coupled convection.
APTIC-24583

ON INCREASED CHIMNEY HEIGHT.

(Zur Schornstein-Uerberhoehung). Text in German. Beitr. Physik Atmosphaere, 37 (2):132-158, 1964. 11 refs.
Hanns Rauch.

Identifiers: *Altitude, *Plume behavior, *Stacks, Germany, Stack gases, Smokes, Photographic methods, Winds, Stability (atmospheric).

Two industrial chimneys of different height, orifice diameter, efflux velocity and temperature, and different surroundings were used to obtain photographs of smoke plumes under different meteorological conditions, such as thermal stability and wind velocity. The photographs were used to deduce the altitude of the mean plume axis below the chimney. With the aid of the measured emission data and meteorological parameters, 400 sets of observations were obtained. They are reproduced in full. When the formulas of Lucas and Holland were applied to the results, the former gave a smaller standard deviation as well as a smaller dependence on stability.
APTIC-24585

DEVELOPMENT OF AN ATMOSPHERIC TRANSPORT MODEL.

Oak Ridge National Lab., Tenn., Intern. Symp. Fission Prod. Release Transport Under Accident Conditions, Oak Ridge, Tenn., April 1965, p. 405-428. 6 refs. (April 5-7.) CFSTI: CONF-650407 (Vol. 1)
J. J. Fuquay, and C. L. Simpson.
Identifiers: *Diffusion models, *Transport, Continuous, Deposition, Plume behavior, Tracers, Winds, Stability (atmospheric).

The consequences of a continuous release of material into the atmosphere are approximated by the bivariate normal diffusional model. The vertical growth of the cloud in the model depends on the stability of the atmosphere. The lateral growth is related to variations in the wind velocity and the travel time. From diffusion data of 46 high-quality zinc sulfide experiments embracing a broad spectrum of meteorological conditions, it is shown that lateral cloud growth varies as time to the first power for short travel times and as the square root of time at long times. These equations for plume growth are verified with a set of independent data. The inclusion of wind variability as a parameter in the model permits calculations of air exposures for longer release periods than those that have been experimentally studied. The model specifies diffusion as a time-dependent process. The variance in experimental exposure data is significantly reduced if comparisons are made for fixed time rather than for fixed distances. Deposition of materials on the surface depends on the vertical growth of the cloud, the wind speed, and the properties of the tracer. The relationships are derived for growth parameters, and the inclusion of the deposition factor in the bivariate model permits a simple and direct means for evaluating the consequences of a release from known meteorological conditions. (Author abstract)
APTIC-24606

NATURAL SOURCES OF GASEOUS POLLUTANTS IN THE ATMOSPHERE.

Preprint, Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio, 32p., 1958. 113 refs.
Aubrey P. Altshuller.
Identifiers: *Photolysis, *Reaction mechanisms, Formaldehydes, Ammonia, Chlorine compounds, Hydrocarbons, Hydrogen, Mercaptans, Carbon monoxide, Nitrogen oxides, Nitrous oxide (n2o), Ozone, Hydrogen sulfide, Free radicals, Solar radiation, Gases.

Even if all man-made sources of pollution could be completely eliminated, concentrations of many natural pollutants would remain. These concentrations, therefore, represent the lowest possible concentrations of pollutants achievable with perfect air control devices. These natural concentrations also can be of some importance in the calibration of air pollution control instruments. Moreover, since many of these gaseous pollutants react with each other and undergo photolysis in the presence of sunlight, a knowledge of their reaction processes is necessary to understand overall gaseous pollution. The methods of production, destruction, and known concentrations of the following trace gases are discussed: ozone, nitrogen oxides, hydrocarbons, hydrogen, formaldehyde, carbon monoxide, hydrogen sulfide and mercaptans, ammonia, chlorine compounds, and the free radicals OH, HO2, CH3, and CH2. Reliable concentration data are available only for ozone and nitrous oxide, each of which averages about 3 ppm in the atmosphere. Suitable methods for determining the other trace gases are suggested.
APTIC-24615

DUST IN THE CARIBBEAN ATMOSPHERE TRACED TO AN AFRICAN DUST STORM.

Earth Planet. Sci. Lett., 9 (3):287-293, Oct. 1970. 8 refs.
Joseph M. Prospero, Enrico Bonatti, Carl Schubert, and Toby N. Carlson.
Identifiers: *Barbados, *Dusts, *Transport, Seasonal, Air quality measurements, Chemical composition, Particle size, Atmospheric movements.

One of the largest dust samples ever collected in Barbados had a dust load of 2.2 micrograms/cu m of air and a total weight of 41.6 g. By computing parcel air trajectories for the sample, it was determined that the dust laden air crossed the cost of Africa in the region of Mauritania and was transported across the Atlantic in five days at a speed of 40 km/hr. The origin of the sample was confirmed by a satellite photograph showing a dust storm whose leading edge extended some 500 km from the coast of Africa to the region of the Cape Verde Islands. The composition and color of the dust was similar to that of typical summer-fall dusts in Barbados except for a higher quartz content and the fact that 25% of the mass consisted of particles greater than 10 micron. The character of the size distribution is attributed to the unusually energetic nature of the dust storm. It is concluded that the bulk of the dust collected at Barbados during summer and early fall is derived from the general area of the dust storm, principally from the Spanish Sahara, Mauritania, Mali, and Senegal.
APTIC-24632

THE WAVELENGTH DEPENDENCE OF ATMOSPHERIC EXTINCTION.

Appl. Opt., 9 (11):2539-2542, Nov. 1970. 16 refs.
W. Blitzstein, H. F. Fliegel, and Y. Kondo.
Identifiers: *Extinction coefficients, *Photometric methods, Mathematical modeling, Scattering (atmospheric), Ozone, Light radiation.

Atmospheric extinction coefficients determined at Flower and Cook Observatory for the Johnson B and V spectral responses are compared with the predictions of two models based on theoretical and observational parameters. The Pierce-Blitzstein photometer was utilized in conjunction with a 38-cm aperture, visually corrected, horizontal refractor and siderostat. Basic data for the determination of the instantaneous extinction coefficients were extracted from the necessary measurements made by several observers who were involved in determining accurately the variations in the received radiant flux from eclipsing binary stars. Some of the observed deviations from the models can be explained as telluric line absorption in the wavelength region of the V response. The remaining differences arise from the use of different observational data in calculating the Rayleigh attenuation coefficients and the ozone attenuation coefficients, and local differences in the characteristics of the atmosphere. High and variable extinction coefficients seem to show an individual wavelength dependence and a periodicity with respect to time. (Author abstract modified)
APTIC-24658

DESIGN OF A FACILITY (SMOG CHAMBER) FOR STUDYING PHOTOCHEMICAL REACTIONS UNDER SIMULATED TROPOSPHERIC CONDITIONS.

For primary bibliographic entry see Field 03.
APTIC-24659

HYDROCARBON REACTIVITIES IN THE ATMOSPHERIC PHOTOOXIDATION OF NITRIC OXIDE.

Environ. Sci. Technol., 4 (11):916-924, Nov. 1970. 29 refs. (Presented at the American Chemical Society, 150th Meeting, Div. of Water, Air, and Waste Chemistry, Atlantic City, N. J., Sept. 1965.)
William A. Glasson, and Charles S. Tuesday.
Identifiers: *Hydrocarbons, *Nitric oxide (no), *Photooxidation, Spectrophotometry, Olefins, Aromatic hydrocarbons, Polynuclear compounds, Chemical bonds, Infrared radiation, Reaction kinetics, Reaction mechanisms.

By use of long-path infrared spectrophotometry, reactivities of a large number of hydrocarbons in the atmospheric photooxidation of nitric oxide were determined under a standard set of experimental conditions simulating those of the atmosphere. Light intensity was measured by photolyzing very low concentrations of nitrogen dioxide in nitrogen and is expressed as the first-order rate constant for photolysis. Even though the most reactive hydrocarbons are olefins, some aromatic hydrocarbons are more reactive than some olefins, and some paraffins are more reactive than some aromatics. The variation of reactivity with structure for both olefins and aromatics suggests that attack by an electrophilic agent at the double bond and aromatic ring, respectively, is involved n the nitric oxide photooxidation reaction, while the effect of structure on paraffin reactivity implicates the oxygen atom 'displacement-type' reaction. Although the individual hydrocarbon reactivities measured in this study may be useful in determining the reactivity of complex hydrocarbon mixtures, a hydrocarbon reactivity classification system has also been suggested for more approximate reactivity determinations. (Author abstract modified)
APTIC-24660

THEORETICAL COLLISION EFFICIENCIES OF CHARGED CLOUD DROPLETS.

J. Geophys. Res., 75 (9):1633-1640, March 20, 1970. 13 refs.
Ilga R. Paluch.
Identifiers: *Collision efficiencies, *Clouds, *Electric charge, Droplets, Particle size, Mathematical analyses, Particle growth.

A simplified approach to the problem of finding adequate approximation formulas for collision efficiencies is developed, as applied to the general question of devising mathematical models of cloud droplet growth and precipitation which take into account electrical forces. Analytical expressions for collision efficiencies in several extreme cases are derived and used as a basis for empirical approximation formulas of collision efficiencies obtained by numerical integration of droplet trajectories. Approximation formulas, restricted to the case in which no external electric fields are present, are given for collisions between droplets less than or equal to 20 micron in radius, carrying an average surface charge density more than or equal to 0.16 esu/sq cm, and collisions between large drops (radius more than or equal to 500 micron and small droplets (radius more than or equal to 2 micron). Approximation formulas for collision efficiencies between large charged drops in the 100- to 1000-micron radius range include vertical electric fields. Although this approach is limited to cases in which droplet sizes, charges, and external electric fields are such that some forces in the equation of relative droplet motion predominate others, it is found to be useful over considerable ranges of physically meaningful situations. (Author abstract modified)
APTIC-24662

ELECTRIC PROPERTIES OF ICE FOG CRYSTALS.

J. Appl. Meteorol., 9 (2):289-293, April 1970. 10 refs.
Takeshi Ohtake, and Rudolf G. Suchannek.

Identifiers: *Fog, *Ice, *Electrical properties, Alaska, Electron microscopy, Microscopy, Laboratory facilities, Electric charge.

Experiments are described in which the electric properties of ice fog crystals were studied by observing the crystals in natural ice fogs (at temperatures of about -35 C) and in artificial ice fog (in a cold chamber and in an environmental cold room, at temperatures of -35 to -47 C) in both uniform and nonuniform fields. High voltages with different polarities were applied to the experimental electrodes. In nonuniform fields, the positive wire always received more deposit than the negative wire, while there was no deposition of crystal on electrodes in a uniform field. Observation of an insignificantly small net charge of ice fog crystals in a uniform field was supported by the result of optical and electron microscope studies, which did not indicate any effects of generally proposed mechanisms for charge separation. An upper bound for the net charged is derived, and the observations are discussed in relation to the induced dipole moment and Weyl's model of ice crystals.
APTIC-24663

AIR POLLUTION; II. METEOROLOGICAL ASPECTS OF URBAN POLLUTION.

(La contaminacion atmosferica; II. Aspectos meteorologicos de la contaminacion en las ciudades). Text in Spanish. Gac. Med. Mex., 100 (3):257-262, March 1970.
Sergio Serra-Castelan, and Jose Arroyo-Garcia.
Identifiers: *Mexico city, *Visibility, *Meteorology, Diurnal, Meuse valley, London, Donora, Urban areas, Valleys, Combustion products, Dusts, Smog index, Air pollution forecasting, Altitude, Anticyclones, Winds, Fog, Rain, Inversion, Topographic interactions.

The three most serious air pollution incidents in modern times (Meuse Valley, Donora, London) were all connected with unusual meteorological conditions, which emphasizes the importance of meteorology to the subject. Air pollution incidents are usually connected with the occurrence of anticyclones. Mexico City, due to its location in the tropical latitudes, is more subject to cyclones and anti-cyclones than habitations located outside such latitudes, is 2400 meters above sea level, and is, at the same time, situated in a valley. Studies of visibility in the area indicate that this is a diminishing factor from year to year. In the evening hours of December 24, 1969, and for five hours of the following day, extremely low visibility occurred. At the International Airport, for example, visibility was reduced to 100 meters by fog, dust, and other combustion products. This was attributed to a lack of air movement and a temperature inversion over the city. Maximum wind velocity was observed to be 0.2 m/sec, and there was a temperature inversion at approximately 5570 meters above sea level, settling downward to 4600 meters. Long-range daily observations indicate that average visibility is lowest from 6 to 8 am and highest from 5 to 6 pm explainable on the basis of meteorological principles. A 5-point program is proposed for studying the meteorological factors that could create a condition of abnormal pollutant concentration in the Mexico City area. A study of data on wind direction and velocity would be helpful in planning the location of industrial plants. Correlation of meteorological systems with pollution readings could serve as the basis of a warning system, to notify the community that the conditions for a dangerous incident are present. Rainfall could also be analyzed chemically to determine its role in purifying the atmosphere.
APTIC-24669

THE PHYSICS OF LIGHT SCATTERING.

Opt. Spectra, 4 (7):52-56, July/Aug. 1970. 10 refs.
Franklin S. Harris Jr.
Identifiers: *Light scattering, Aerosols, Particle size, Absorption, Lasers, Atmospheric phenomena, Clouds, Fog, Scattering (atmospheric), Diffraction, Corona, Refractive index.

Scattering is a process by which radiant energy incident on an arbitrary medium is redistributed into one or more angular directions of propagation. Several types of physical processes contribute to scattering, and mention is made of refraction, reflection, diffraction, and absorption. The scattering of electromagnetic radiation by a particle is treated by applying Maxwell's equations, while the predicted scattering for spheres is calculated with the convenience of computers with Mie theory using a series of Bessel and Legendre functions. Polarization characteristics of the scattered radiation depend on the polarization of the incident beam, the index of refraction, the size parameter, and the angle. Scattering calculations are mentioned, as well as simultaneous scattering. If there are many particles close together in a cloud or fog, a photon may interact many times with different particles before escaping from the cloud. Multiple scattering is discussed, as are several intriguing optical phenomena due to scattering. The corona is found at small angles of scatter of a few degrees, the cloud bow is around 140 deg, and the glory or anticorona is near 180 deg. Another not-as-often seen phenomenon is the green flash, so-called because sometimes one can see a faint green flash for a fraction of a second just as the edge of the sun goes below the horizon. The effect of absorption is reviewed, as well as the usefulness of lidar. By means of pulsed light reflected back at 180 deg, the total reflectivity as a function of distance can be learned. The size distribution of aerosols is indicated. Because of scattering, the atmospheric transmission of energy is reduced, with consequences to the earth's heat budget. Scattering measurements can also lead to knowledge of air pollution.
APTIC-24680

OZONE ABSORPTION COEFFICIENTS IN THE VISIBLE AND ULTRAVIOLET REGIONS.

For primary bibliographic entry see Field 06.
APTIC-24701

SOME STATISTICAL ASPECTS OF LONG-TERM FLUCTUATIONS IN SOLAR AND ATMOSPHERIC PHENOMENA.

Ann. N. Y. Acad. Sci., vol. 95:173-187, 1961. 10 refs.
G. W. Brier.
Identifiers: *Statistical analyses, *Atmospheric phenomena, *Solar radiation, Precipitation, Pressure (atmospheric), Temperature (atmospheric).

Quantitative observations of the solar disc have been made for more than 250 years, and compiled sunspot numbers have been used in attempts to determine if a relationship exists between solar activity and meteorological variables such as precipitation, pressure, and temperature. In general, the results were inconclusive partly because of the crudity of the statistical methods used and also because of the shortness of the meteorological time series available. Using the modern statistical technique of power spectrum analysis and high-speed computers, the present work re-examined some of the solar and weather data for time series dating back to 1950. The series were critically examined for any evidence of influence by the well-known solar cycle of about 11 yr. In addition, the data were treated with 22- and 5.5-yr band-pass filters to recover phase information and to study possible nonlinear effects. Preliminary results indicate that no appreciable component of the 11-yr solar cycle shows up in the precipitation data. There is the possibility that the solar effect does not always act in the same direction but depends on initial conditions of the earth-atmosphere system in some nonlinear fashion. That some such interaction may exist is suggested by the results of examining anomalies in a filtered precipitation series, where some evidence of nonrandomness in phases is indicated.
APTIC-24758

ANALYSIS OF LOWER ATMOSPHERIC DATA FOR DIFFUSION STUDIES. (FINAL REPORT).

GCA Corp., Bedford, Mass., GCA Technology Div., Contract NAS8-30503, Rept. TR-69-15N, 126p., April 1970. 31 refs. NTIS: N70-30076
F. A. Record, R. N. Swanson, H. E. Cramer, and R. K. Dumbauld.
Identifiers: *Fuels, *Missiles and rockets, *Diffusion models, Toxicity, Computer programs, Ground level, Lower atmosphere, Plume behavior, Point sources, Winds, Clouds, Temperature gradient, Turbulence (atmospheric).

A report describing generalized diffusion models selected for use in estimating toxic fuel hazards at Kennedy Space Center and the development of requisite meteorological inputs for these models through an intensive analysis of measurements is presented. The models are adjustable for initial cloud dimensions near to the source and source emission time and are in principle applicable to all source types. The basic model format is similar to the conventional Gaussian plume equation. Subsets of equations are developed for calculating buoyant plume rise caused by the liberation of thermal energy at the source. Because of the 5 km depth of the atmosphere that must be considered, the models are incorporated in a multi-layer construct which is programmed for computer calculations of concentration fields. In the development of requisite meteorological inputs for the model, a detailed study was made of data from a 150 m tower facility. Attention was centered on defining the properties of representative vertical profiles of wind speed, temperature, and the lateral intensity of turbulence and establishing the dependence of these profile properties on mean wind speed, wind direction, and time of day. For many reasons, including uncertainties in source definition as well as uncertainties contributed by atmospheric factors, the development and validation of procedures for the estimation of toxicity hazards arising from the use of rocket engine fuels must be a continuing process. Recommendations directed toward improving the accuracy of hazard predictions are included. (Author summary modified)
APTIC-24761

DEVELOPMENT OF MOLECULAR CONDENSATION NUCLEI AND CONDITIONS FOR ITS OBSERVATION.

For primary bibliographic entry see Field 06.
APTIC-24764

AUTHOR'S REPLY TO THE PRECEDING DISCUSSION.

J. Geophys. Res., 67 (11):4510-4511, Oct. 1962. 10 refs.
E. P. Ney, and John Kroening.
Identifiers: *Trace analysis, *Stagnation, *Ozone, Altitude, Diffusion, Electricity (atmospheric), Temperature.

In replying to criticism of their recent paper on atmospheric ozone, the authors maintain that it is possible to measure large ozone gradients near the ground under calm conditions if the surface is indeed an ozone sink. They contend also that their values of diffusivity give the order of magnitude of this property and that their calculations of ozone produced by electrical activity in the atmosphere are correct precisely because they are not based on the incorrect physical model of Paetzold. With respect to the production of ozone by nuclear explosions, the authors state that they did not discuss the question of how much ozone survived the high temperatures.
APTIC-24774

DISCUSSION OF PAPER BY J. KROENING AND E. P. NEY, 'ATMOSPHERIC OZONE.'

J. Geophys. Res., 67 (11):4508-4509, Oct. 1962. 7 refs.
K. Buettner, J. Businger, and R. Charlson.
Identifiers: *Ozone, Altitude, Diffusion, Electricity (atmospheric), Solar radiation, Ultraviolet radiation, Visible radiation, Temperature.

Atmospheric ozone soundings published in a recent paper may aid in the indentification of advected air laminae. However, there is no basis for a number of conclusions reached by the authors. The concept of an ozone sink or sink strength that is independent of the local ozone concentration, temperature, and diffusion coefficients is untenable. Lightening does not produce about as much ozone as does solar radiation. The reported values for eddy diffusivity have little physical meaning. The high temperatures following the production of ozone in nuclear explosions would lead to immediate ozone decay. Finally, quanta appear to be used for light, heat, and sferics as well as ozone formation which considerably reduces the energy available for the formation of ozone and, therefore, the ozone produced by lightning.
APTIC-24775

THE PRODUCTION OF NUCLEI BY PHOTOCHEMICAL DECOMPOSITIONS OF HYDROGEN SULFIDE.

Vienna Univ. (Austria), Physikalisches Inst.
NAPCA Grant AP00468-03, p. 178-181, 1969 (*). 3 refs.
F. Scholz.
Identifiers: *Hydrogen sulfide, *Photochemical reactions, *Aerosols, Europe, Particle size, Nitrogen.

Production of aerosols by photochemical decomposition of hydrogen sulfide was found to be dependent on S2 production and coagulation, both of which are dependent on concentration and residence time. Long residence time and high H2S concentration yield particles up to 0.7 micron. The apparatus is described and depicted in which H2S diluted with N2 flows through a flow-meter and a quartz tube. The gases are irradiated in the quartz tube, and the particle number per cc is measured in a Rich-counter.
APTIC-24779

A CONDENSATION NUCLEI COUNTER WITH AN EXPANSION PROGRAMME.

For primary bibliographic entry see Field 03.
APTIC-24780

AIR POLLUTION IN KAWASAKI.

For primary bibliographic entry see Field 04.
APTIC-24789

AN INVESTIGATION OF ATMOSPHERIC STRUCTURE IN THE LOWER TROPOSPHERE BY LIDAR PROBING.

Wisconsin Univ., Madison, Dept. of Electrical Engineering, Thesis (Ph.D.), Ann Arbor, Mich., Univ. Microfilms, Inc., 1968, 178p. 58 refs.
John Albert Reagan.
Identifiers: *Lidar, *Lower atmosphere, Feasibility studies, Experimental methods, Lasers, Mathematical modeling, Meteorology, Scattering (atmospheric).

A program was undertaken to investigate the capability of lidar as a remote probe for indicating atmospheric structure. First, a survey of the literature was made to determine the present state of lidar research, and a brief study was made of the scattering processes which control the lidar signal. Lidar system characteristics were then investigated to determine useful data handling techniques and to examine ramifications involved in aligning the system. Comparisons of the simultaneous lidar-meteorological observations demonstrated the utility of such experiments for relating lidar response characteristics to atmospheric structure. In general, the experimental results supported the supposition that lidar can effectively indicate prominent structural features by using the particulate distribution as a tracer. As anticipated, the returns only indicate the more pronounced transitional features in the atmosphere, and the information provided about the nature of these features is qualitative. Lidar is most useful at this stage of development when combined with other probing techniques. The model atmospheres and corresponding inferred lidar return responses proved valuable in interpreting experimental observations. Using the angular energy distributions which were developed, it was possible to determine model lidar returns which closely approximated the experimental returns. It was then possible to evaluate the data from the collimation experiment, and the results indicated that the experimental collimation technique can be used successfully to collimate the lidar. It is recommended that the effect of humidity variations on lidar backscatter which was implied by the comparisoons shown here should be explored in greater detail. Additional experiments should also be performed to determine the feasibilitty of using lidar as a tool for precipitation studies. Further possibilities for extensions of lidar research are suggested. (Author conclusions modified)
APTIC-24795

TURBULENT BUOYANT JETS INTO STRATIFIED OR FLOWING AMBIENT FLUIDS.

For primary bibliographic entry see Field 06.
APTIC-24797

MODEL TESTS ON FLOW FROM A BUILDING VENTILATION STACK.

Atomic Energy Establishment, Winfrith, England, Rept. AEEW-R 227, 18p., Nov. 1962. 3 refs.
A. L. Skinner.
Identifiers: *Stacks, *Simulation, *Dispersion, *Plume behavior, Great britain, Buildings, Ventilation, Diffusion, Winds, Flow rates.

Wind tunnel tests were made on a model of a building for handling radioactive materials to assess the minimum requirements for a stack which would effectively disperse the ventilation air clear of the building wind eddies and also avoid recirculation into the inlet grille. The factors of wind direction and speed, the detail design of the stack top, its height and the discharge velocity were studied, using still and cine photography. The results suggest that just sufficient clearance of the plume could be expected for normal conditions with a stack height of 90 ft. This equals 1.7 times the height of the highest part of the roof or 2.25 times the average roof height. A high discharge velocity and a cone or ring at the stack outlet all gave a marked improvement in the flow. (Author abstract modified)
APTIC-24803

SPECTRAL TRANSPARENCY OF HAZE IN THE SPECTRAL REGION FROM 0.37 TO 1.0 MICRONS.

Bull. Acad. Sci. USSR, Phys. Atmos. Oceans (English translation from Russian of: Izv. Akad. Nauk SSSR, Fiz. Atmosfery i Okeana), 5 (4):69-79, Sept. 4, 1969. 16 refs. Also: Izv. Akad. Nauk SSSR, Fiz. Atmos. Okeana, 5 (4):388-394, April 1969. CFSTI: JPRS 48753
Yu. S. Georgiyevskiy.
Identifiers: *Spectrometry, *Haze, Ussr, Aerosols, Light scattering.

A systematic study of the spectral transparency of surface air in the range 0.37-1.00 microns established that there is a strong correlation between the optical densities in different parts of the investigated spectral range in hazes. The condensation process plays the principal role in atmospheric turbidity; the contribution of particles of solid aerosols to light attenuation is small in comparison with the contribution of the aqueous fraction. (Author summary modified)
APTIC-24805

SOUND PROPAGATION IN AN AEROSOL.

Brown Univ., Providence, R. I., Dept. of Physics, Thesis (Ph.D.), Ann Arbor, Mich., Univ. Microfilms, Inc., 1966, 62p. 40 refs.
Samuel Temkin.
Identifiers: *Sound waves, *Aerosols, Mathematical analyses, Dispersion, Scattering (atmospheric), Aluminum oxides.

A theory for particulate attenuation and dispersion of sound is formulated in a manner which shows explicitly the relaxation character of the problem. Basic equations and particle-gas interaction terms are presented, as well as results for low mass and finite mass concentrations. Comparison is then made with experimental data from Zink and Delsasso who measured attenuation and dispersion by alumina particles at acoustic frequencies ranging from 500 to 13,600 cps. It was then undertaken to measure the dispersion of sound by an aerosol in a wide range of omega (tau-d), where omega is equal to the circular acoustic frequency and tau-d is the dynamic relaxation time of the particle, with special attention given to small values where no previous measurements have been made. Equipment used to measure attenuation and dispersion of sound by an aerosol consisted mainly of an acoustic interferometer for the acoustic tests, an aerosol generator, and an optical scattering photometer for the measurement of particle size and concentration.
APTIC-24806

SINGLET MOLECULAR OXYGEN AND THE PHOTOCHEMISTRY OF URBAN ATMOSPHERES.

Ann. N. Y. Acad. Sci., 171:239-272, 1970. 66 refs.
James N. Pitts Jr.
Identifiers: *Singlet molecular oxygen, *Urban areas, *Photochemical reactions, Los angeles, Oxidants, Smog, Spectrophotometry, Olefins, Nitrogen dioxide (no2), Oxygen, Ozone, Solar radiation, Ultraviolet radiation, Reaction mechanisms.

Although considerable understanding of the chemical and biological effects of photochemical air pollution (Los Angeles smog) has now been obtained, the present status of the overall mechanism of the formation of 'photochemical oxidant' has not substantially advanced from the early 1960's. Current mechanisms dealing with the ultraviolet-irradiated nitrogen dioxide-Hydrocarbon-Air system, characteristic of urban atmospheres and simulated in test chambers, cannot explain such phenomena as the observed substantial excess in the rate of consumption of hydrocarbons over the calculated rate, a factor of about twenty, and the fact that overall material balances account for only approximately 50% or less of the hydrocarbons consumed in the reaction. A new oxidant-electronically excited singlet oxygen, may be involved in these systems; that is, in test chambers as well as in polluted urban atmospheres. Unexplained atmospheric chemical and possibly biological effects might be attributed to these excited species; a gas phase Kautsky-type of energy transfer mechanism is a reasonable means of producing singlet oxygen in ultraviolet-irradiated polluted air, or in test chambers. Three additional routes for the production of singlet oxygen are: direct absorption of solar radiation by ground-state molecular oxygen, photodecomposition of ozone at wavelengths shorter than about 3200 A, and 02 as a product of certain exothermic atmospheric chemical reactions. Several of these processes have been observed both in the mm pressure range and under simulated atmospheric conditions using an infrared spectrophotometer fitted with 40-meter path-length cells that has ports through which the system can be irradiated by an external light source. A possible fifth route for formation of singlet oxygen was also discovered. This involved the perturbation of the ultraviolet absorption of certain olefins, resulting in a shift to longer wavelengths by a 'collision complex' with ground-state molecular oxygen. Each of these five mechanisms are discussed and recent evidence is presented in support of their validity. A review of the nature of 'photochemical oxidant' in real smog is presented, as well as some implications of the presence of singlet oxygen in urban atmospheres, not only in terms of its chemical effects, but also

in terms of possible biological and health implications. (Author introduction modified)
APTIC-24825

PROBLEMS SET BY ATMOSPHERIC POLLUTION IN JAPAN.

For primary bibliographic entry see Field 01.
APTIC-24826

PLUME EFFECTS OF NATURAL DRAFT HYPERBOLIC COOLING TOWERS.

Combustion, 42 (4):54-57, Oct. 1970. 1 ref.
(Presented at the American Power Conference,
Chicago, Ill., April 21-23, 1970.)
Robert F. Vishisky, George F. Bierman, and
Carroll H. Bitting.
Identifiers: *Nuclear power plants, *Scrubbers, *Plume behavior, *Cooling, Stack gases, Electric power production, Computers, Mathematical modeling, Photographic methods, Air pollution forecasting, Lower atmosphere, Diffusion models, Advection, Winds, Fog, Humidity, Temperature (atmospheric), Inversion.

In order to maintain good neighborly relations at the Three Mile Island Nuclear Station, preliminary investigations of the effects of cooling tower plumes were performed by various methods, including mathematical models. A major concern in operating natural draft towers is a potential to cause fog or to increase its duration. Radiation fog and advection fog are discussed, as well as the effects of inversions. As a most direct means of visual correlation, aerial photographs were taken of plumes from the Keystone Station which has four natural draft hyperbolic cooling towers of the counterflow design. A 'Cumulus Cloud Model' for computer application was chosen as being most nearly the same as a cooling tower plume. The basic meteorological data gathered includes wind speed, wind direction, temperature, and some measure of humidity. Utilizing the U. S. Weather Bureau data only, a statistical forecast of two towers' operation indicates a fogging potential for the southeast end of Olmsted Airport for approximately 29 hours per year. With the addition of a second unit and two more cooling towers at Three Mile Island Nuclear Station, the potential is increased to about 39 hours per year. At present, the cumulus cloud model indicates that the critical elevations of inversion which impose a lid on plume dissipation will occur at about 1000 to 1200 feet above ground for a single tower, and 1500 to 1700 feet for two towers with merging plumes.
APTIC-24835

PRODUCTION AND DESTRUCTION MECHANISMS FOR 02 (1 DELTA G) IN THE LOWER ATMOSPHERE.

Ann. N. Y. Acad. Sci., vol. 171:273-296, 1970. 72 refs.
R. H. Kummler, and M. H. Bortner.
Identifiers: *Smog, *Oxygen, *Reaction mechanisms, Quenching, Lower atmosphere, Nitric oxide (no), Ozone, Photolysis, Solar radiation, Reaction kinetics.

The role of singlet oxygen and in particular oxygen in the 1 delta g state in the environment has become an important and as yet unsolved issue. The resolution of this issue rests upon the ultimate answers, as yet only partially documented, to four coupled questions. These involve, first, the rate constant for the reaction of oxygen in the 1 delta g state with other constituents of polluted atmospheres; second, the magnitude of the oxygen in the 1 delta g state production sources in such atmospheres, third, the rate of oxygen in the 1 delta g state destruction; and fourth, the subsequent role of the reaction products. Present knowledge of the answers to these questions is discussed. The production sources evaluated include spontaneous and collisionally induced absorption of solar energy at 1.27 micron, the Hartley photolysis of ozone near 3000 A, exothermic chemical reaction of pollutant gases, and energy transfer from triplet states of organic molecules. The absorption at 1.27 micron, negligible, while Hartley photolysis produces 0.1 pphm of oxygen in the 1 delta g state/hr in Los Angeles at noon. The chemical reaction of nitrix oxide and ozone could produce over 100 pphm/hr if the quantum yield is 10% and energy transfer could produce an upper limit of 80 pphm/hr with unity quantum yield. Both processes are operative in the early morning hours. The dominant destruction mechanism is physical quenching by 02, which yields an approximate lifetime of 0.09 seconds in the urban environment. Thus, the steady-state concentration of oxygen in the 1 delta g state could be as high as 0.002 pphm under typical contaminated conditions in Los Angeles, and almost certainly exceeds 0.000002 pphm near noon. Since these concentrations equal or exceed the 0 atom concentrations, the competitive reactivity of these oxygen allotropes could be extremely important. The implications of oxygen in the 1 delta g state at concentrations on the order of the steady state values are considered. A major reaction controlling the electron densities in the D region of the atmosphere is the Penning ionization analog, deexcitation detachment of 02. The role of singlet oxygen in this reaction is discussed in the light of recent experimental studies in the discharge flow-drift tube. (Author summary modified)
APTIC-24836

CONDENSATION NUCLEI: PRODUCTION OF VERY LARGE NUMBERS IN COUNTRY AIR.

Science, 170 (3960):851-852, Nov. 20, 1970. 3 refs.
Vincent J. Schaefer.
Identifiers: *Non-urban areas, *Condensation (atmospheric), *Particle growth, Aitken counters, Iodine, Nucleation, Vapors.

When relatively clean country air is exposed to the saturated vapor of iodine or turpentine, very large numbers of condensation nuclei develop. A typical measurement at noon at a field station 2 miles north of Flagstaff, Arizona, showed a nuclei count of 400 cloud nuclei and 2400 Aitken nuclei; the same air exposed to either iodine or turpentine vapor showed 30,000 cloud nuclei and more than 1,000,000 Aitken nuclei. If the air sample is exposed to the vapors of turpentine and some of the constituents--alpha or beta-pinene, and limonene, a citrus derivative--the same large increase in nuclei occurs during the night, and that reaction of the air sample with iodine vapor that has been exposed to light produces the same result. Thus, the molecular or ion clusters or pseudo-embryos that agglomerate to produce active condensation nuclei seem to be always present in pollution free air. Only in heavily polluted air or in extremely pure air is it absent. An attempt to duplicate this effect is mentioned, and it is suggested that this reaction may be a useful way to measure the degree of cleanliness of the air.
APTIC-24843

SYMPOSIUM ON THE DISPERSION OF CHIMNEY GASES. II.

Intern. J. Air Water Pollution (London), vol. 6:96-99, 1962. 2 refs.
R. S. Scorer.
Identifiers: *Dispersion, *Plume behavior, Stack gases, Stacks, Winds, Turbulence (atmospheric), Ground level.

Theories of thermal rise of stack gases and variations of thermal rise with wind velocity are discussed. The height reached by the time the effluent has drifted downwind about 15 effective chimney heights is considered. For strong winds and low buoyancy output, the spreading of the plume is almost entirely due to wind eddies. In near calm conditions, the spreading is caused mainly by eddies generated by the rise of the plume. For light winds and high buoyancy output, the rise should hardly be affected by the wind. Maximum ground level pollution on any theory varies inversely as wind velocity and as the inverse square of total height. This leads to the expectation of very high pollution in a calm; a fall to a minimum in the region of 1-3 miles/hr; and a maximum at some higher velocity, both velocities depending on buoyancy output. Thermal rise is theorized as complete when the vertical velocities due to buoyancy become less than the typical velocities of the turbulence already in the atmosphere. After bending, the behavior of a buoyant plume is more like that of a cylindrical thermal.
APTIC-24869

EVAPORATION RATES AND LIFETIMES OF CLOUDS AND SPRAYS IN AIR. II. THE CONTINUUM MODEL.

J. Chem. Phys., 47 (9):3578-3581, Nov. 1, 1967. 4 refs.
Joseph T. Zung.
Identifiers: *Clouds, *Evaporation, *Droplets, Sprays, Mathematical modeling, Vapors.

A mathematical model is proposed for the prediction of the evaporation rates and lifetimes of clouds and sprays in air, which is based on the continuum approach that considers a droplet system as a uniform spherical source of vapor with a strength equal to the amount of vapor evaporated from the droplets per unit volume. Cloud equations derived from this model are expressed in terms of either the vapor concentration or the droplet mass. Further approximation leads to a linearized cloud equation which can be reduced to a simple diffusion equation to be solved by standard methods. Numerical results show that the continuum model describes the behavior of a saturated droplet system much more satisfactorily than the cellular model which has been recently proposed. For an unsaturated system, however, the cellular model remains adequate. By combining both of these models, a general model is obtained, which should be of general validity for all droplet systems evaporating into a fixed atmosphere. (Author abstract)
APTIC-24890

POSSIBLE CAUSES OF REDUCTION IN DIRECT SOLAR RADIATION.

(O vozmozhnykh prichinakh oslableniya pryamoy
solnechnoy radiatsii). Text in Russian. Tr. Gl.
Geofiz. Observ. (Leningrad), no. 233:38-44, 1968.
33 refs.
I. I. Borzenkova.
Identifiers: *Solar radiation, *Volcanoes, *Dusts, Ussr, Mountains, Humidity.

Effects of changes in solar activity and of atmospheric dust of volcanic origin on the intensity of solar radiation reaching the surface of the earth are discussed on the basis of available literature. Actinometric data on the absorption of solar radiation by atmospheric water vapor and dust at noon on cloudless days, gathered during the years 1956-1964 at Kazbegi, the Tyan'-Shan' Mountains, and the Fedchenko Glacier, are reported. Increases in absorption by dust were detected at all three stations during the years 1957, 1963, and 1964, apparently reflecting the effects of volcanic erruptions (Klyuchevsk in 1956, Agung and Batur in 1963, and Taal in 1965). Absorption by water vapor was established at 0.140-0.200 cal/sq cm-min, in close agreement with theory.
APTIC-24896

DEPENDENCE BETWEEN THE CONCENTRATION OF AEROSOLS AND THE INTENSITY OF TURBULENT INTERCHANGE IN LOWER ATMOSPHERE.

(Zavisimost' kontsentratsii aerozoley v
prizemnom sloye atmosfery ot intensivnosti
turbulentnogo obmena v pogranichnom sloye).
Text in Russian. Soobshch. Akad. Nauk Gruz.
SSR, 53 (1):77-80, 1969. 2 refs.
O. V. Lomaya.
Identifiers: *Turbulence (atmospheric), *Lower atmosphere, *Aerosols, Ussr, Mathematical analyses, Ground level.

Experimental data gathered in the vicinity of the Institute of Geophysics of the Academy of Sciences of the Georgian SSR were used to derive an empirical formula which sets aerosol concentration in the atmospheric ground layer equal to 0.92 minus 0.03 times the mean coefficient of turbulence, or 0.58 minus 0.00019 times the height of the boundary layer.
APTIC-24904

RADIOACTIVE COPPER AS AN ATMOSPHERIC TRACER.
For primary bibliographic entry see Field 03.
APTIC-24914

AEROSOL FORMATION FROM GASEOUS AIR POLLUTANTS.
Ind. Eng. Chem., 52 (6):521-524, June 1960. 11 refs.
Manfred Prager, Edgar R. Stephens, and William E. Scott.
Identifiers: *Hydrocarbons, *Nitrogen dioxide (no2), *Photolysis, *Ultraviolet radiation, *Aerosols, Sulfur dioxide, Ozone.

Experiments were carried out in a long-path infrared absorption cell to determine if, in the presence of other pollutants, irradiation of hydrocarbons and nitrogen oxides or dark reactions between hydrocarbons and ozone at ppm concentrations produced an aerosol. The effect of sulfur dioxide on aerosol production in such systems was also studied. While no appreciable amounts of particulates were obtained in the photolysis of nitrogen dioxide with straight-chain mono-olefins, large quantities appeared when sulfur dioxide was added to the system. The longer the reaction proceeded before sulfur dioxide was introduced, the less aerosol was formed. Little or no aerosol formed until nitric oxide had been converted to nitrogen oxide, at which point ozone was observed to form. Once ozone was produced, particulates accumulated rapidly. Particulates were produced during irradiation of diolefins and nitrogen dioxide and cyclic hydrocarbons and nitrogen dioxide. Sulfur dioxide did not significantly affect the rate of aerosol formation or the amounts obtained in the case of cylic olefins. With the diolefins, the rate and the amount varied significantly between 1,3-butadiene and 1,5-hexadiene.
APTIC-24921

EFFECT OF THE FEBRUARY 1959 FOGS ON THE POLYCYCLIC HYDROCARBON CONCENTRATION OF THE ATMOSPHERE OF THE LIEGE AREA.
For primary bibliographic entry see Field 04.
APTIC-24923

STUDY OF ATMOSPHERIC AND AAP OBJECTIVES OF CROSS-BEAM EXPERIMENTS. (FINAL REPORT).
For primary bibliographic entry see Field 03.
APTIC-24924

ON THE ORIGIN OF ICE NUCLEI.
J. Atmospheric Terrest. Phys., vol. 29:1201-1218, 1967. 38 refs.
J. Rosinski.
Identifiers: *Altitude, *Nucleation, *Ice, Aerosols, Ground level, Lower atmosphere, Middle atmosphere, Precipitation, Rain, Snow.

Aerosol particles from the earth's surface, man-made aerosols, and particles of extraterrestrial origin are discussed as three independent sources of ice nuclei in the atmosphere. Measurements at ground level indicated that ice nuclei derive primarily from the earth's surface. They can usually be traced to man-made and soil particles. However, the measurements also showed the existence of some constant concentration of natural ice nuclei in the atmosphere with major changes in concentration produced by precipitation only. Measurements taken at 14.00 hr, when atmospheric conditions are most quiet, suggested the existence of two sources of natural ice nuclei, and airborne measurements were made to determine if a stratospheric source exists. The results show extreme variability of concentration over long distances. The highest concentrations were observed in the vicinity of jet streams and during periods corresponding to Bowen's rainfall anomalies. The findings thus tend to support the hypothesis that meteors produce particles that serve as ice nuclei in the troposphere and also the Bowen hypothesis that a 30-day time lag exists between annually-occurring meteor showers and statistically derived maximum rainfall periods. Future studies of natrual ice nuclei will be complicated by the problem of finding suitable areas where the influence of man-made ice nuclei is minimal.
APTIC-24926

ATMOSPHERIC OZONE.
For primary bibliographic entry see Field 03.
APTIC-24929

INHIBITION OF ATMOSPHERIC PHOTOOXIDATION OF HYDROCARBONS BY NITRIC OXIDE.
Environ. Sci. Technol., 4 (1):37-44, Jan. 1970. 19 refs. (Presented at the American Chemical Society Meeting, 148th, Chicago, Ill., Sept. 1964.)
William A. Glasson, and Charles S. Tuesday.
Identifiers: *Inhibition, *Hydrocarbons, *Nitric oxide (no), *Photooxidation, Spectrophotometry, Olefins, Trans-2-butene, Ethylene, Xylenes, Ozone, Reaction kinetics, Reaction mechanisms.

The effects of nitric oxide concentration on the atmospheric photooxidation of propylene, ethylene, trans-2-butene, isobutene, and m-xylene were investigated using long-path infrared spectrophotometry. Low concentrations of nitric oxide increased the photooxidation rate, while higher concentration inhibited the rate of hydrocarbon photooxidation measured either by hydrocarbon disappearance or product formation. The nitric oxide concentration necessary for the maximum photooxidation rate for a given hydrocarbon concentration decreased as the hydrocarbon concentration decreased; for the olefins studied, it was relatively independent of reactivity or structure. Decreased concentrations of hydrocarbon consistently decreased the rate of hydrocarbon disappearance and product formation at all nitric oxide concentrations investigated. The observation that the maximum photooxidation and ozone formation rates occur at a nitric oxide concentration approximately proportional to the hydrocarbon concentration used suggests that an inhibitory reaction approximately first-order in both nitrogen oxide and hydrocarbon is important. Since the nitric oxide concentration necessary for the maximum photooxidation rate is relatively insensitive to olefin structure, it is implied that the electronic and steric requirements of the inhibitory reaction (s) are similar to those of the rate determining step for photooxidation. (Author abstract modified)
APTIC-24946

THE CALCULATION OF PRECIPITATION SCAVENGING.
Battelle Northwest, Richland, Wash., Physics and Instruments Dept., 31p., July 1965. 43 refs.
CFSTI: BNWL-77
R. J. Engelmann.
Identifiers: *Scavenging, Particulates, Lower atmosphere, Transport, Clouds, Rain, Snow, Washout, Stability (atmospheric), Gases, Electric charge.

A review of scavenging the troposphere is presented. The scavenging process consists of repeated exposures of particles and gases to cloud or precipitation elements, such as rain or snow, each time with some chance of collection on the element. There are three major divisions to the scavenging process: delivery or transport to the scavenging site, in-cloud scavenging by the cloud elements, and below-cloud scavenging by precipitation. The intensity and location of the clouds and precipitation will determine the potential for scavenging and can usually be stated explicitly. Fine details such as entrainment, electrical charge, and snow crystal shape are also important, but generally impossible to specify. Collection efficiency, washout coefficients for particles and gases, rain spectra, and washout by snow are discussed, and some values are given. Extensive 'area within a washout isopleth' charts are shown for three atmospheric stabilities and several washout coefficients. (Author abstract modified)
APTIC-24956

ATMOSPHERIC PHYSICS. ATMOSPHERIC DIFFUSION, DEPOSITION, AND TRANSPORT. (ANNUAL REPORT).
Hanford Labs., Richland, Wash., Rept. HW-77609, 37p., Jan. 1963. 30 refs.
C. L. Simpson, C. E. Elderkin, J. J. Fuquay, P. W. Nickola, and M. F. Scoggins.
Identifiers: *Deposition, *Diffusion, *Transport, Diurnal, Seasonal, Plume behavior, Sea breeze, Pressure (atmospheric), Temperature gradient, Topographic interactions.

Atmospheric diffusion and transport studies during the past year emphasized both analysis of data collected in 1960 through 1962 and the continuation of field experiments over the Hanford Diffusion grids. Detailed analysis of the '30 Series' tests performed at Hanford in 1960-61 and tests performed with the same experimental technique at Cape Canaveral and Vandenberg Air Force Base in 1961-1962 demonstrated effects of climatic regimes and terrain on diffusion results. For both off-site areas, tests performed in the winter, and particularly on winter nights, resulted in the narrowest plumes. The large scale pressure gradients associated with frontal weather control the flow in the wintertime, producing a persistent wind direction, and, consequently, the narrowest plumes. In the summer, the flow was controlled by the small scale sea breeze circulation where local changes and irregularities caused large variations in wind direction, giving the widest plumes observed. At both Cape Canaveral and Vandenberg, the sea breeze prevailed in the summer and frontal weather was dominant in the winter. When the seasonal and diurnal effects were accounted for, plume widths for the two off-site areas were in good agreement and Hanford '30 Series' tests, conducted primarily in the summertime, gave curves of plume widths vs. distance from the source comparing well with the group of off-site summer data. The effect of terrain was most noticeable at Vandenberg. The widest plumes were produced there at night when the summer sea breeze diminished and flow around the terrain features became more pronounced. This situation also resulted in extreme curvature of the plume trajectories. The normalized peak exposures for all three test sites show a dominant gross thermal stability dependence. When this stability dependence is accounted for, the results for the three sites show good agreement. The relationship between dosage and stability was more clearly demonstrated through the crosswind integrated dosages calculateed for the '30 Series' tests. The effect of lateral diffusion in reducing the dosage was thus removed and a more detailed dependence on stability for each test was shown. The lack of agreement between the crosswind integrated form of Sutton's diffusion model and the experimental values plotted vs. distance is considered to to result from deposition on the ground of the diffusing material, which is not accounted for in the mathematical model. (Author abstract modified)
APTIC-24962

THE ADDITION OF NATURAL RADIONUCLIDES TO AEROSOL PARTICLES

AND PRECIPITATION ELEMENTS IN THE ATMOSPHERE.

(Die Anlagerung von Natuerlichen Radionukliden an Aerosolpartikel und Niederschlagselemente in der Atmosphaere). Text in German. Geofis. Pura Appl. (Milan), vol. 50:260-277, 1961. 21 refs.
W. Jacobi.
Identifiers: *Aerosols, *Rain, *Radioactive tracers, Germany, Droplets, Particle size, Diffusion, Tracers, Clouds, Radon, Electric charge.

The addition of radon and thoron-decay-products to the atmospheric aerosol is discussed, taking into account diffusion and electrostatic forces. The computed size distribution of the produced radioactive aerosol agrees with the results of diffusion measurements. The activation of cloud and rain droplets with short-lived decay products happens chiefly due to the diffusion of fresh, carrier-free RaA-atoms. The collection efficiency of falling rain droplets for RaA and ThB was measured in model experiments; it is small compared to the activation of cloud elements. A method for the continuous measurement of RaB- and RaC-activity during rainfall is described; the measured, mean specific acitivity can be explained by the theory of activation processes.
APTIC-24976

AIR QUALITY MODEL SIMULATES TORONTO SKIES.

Water Pollut. Contr., 108 (12):48-49, Dec. 1970.
Bob Gibbon.
Identifiers: *Toronto, *Data-handling systems, *Diffusion models, Seasonal, Canada, Urban areas, Particulates, Emission inventories, Simulation, Air pollution forecasting, Atmospheric movements, Winds, Temperature gradient, Topographic interactions, Hydrocarbons, Carbon dioxide, Nitrogen oxides, Sulfur dioxide.

To effectively combat air pollution in Toronto, Ontario's Air Management Branch has developed a catalogue system that inventories virtually every source of emission. The system also takes into account such variables as weather conditions, topographical features, and seasonal changes. Since the wind field will have a direct bearing on pollution levels, it was defined in terms of a stream function. Factors that could alter the value of the stream function include hill and valley contours which deflect the wind stream, and thermal gradients which can cause distortions in the wind stream. An information system contains all pertinent air quality data including the actual types of pollutants as well as quantities emitted. This inventory includes sulfur dioxide, nitrogen oxide, carbon dioxide, hydrocarbons, and particulates. The mathematical model will relate the climatic and pollution factors to air quality using computer facilities to do the calculations. A brief discussion is included indicating the manner in which pollution source information was obtained.
APTIC-25537

FORMATION OF PARTICLES OF PHOTOLYTIC ORIGIN IN AIR.

(Formation des particules d'origine photolytique dans l'air). Text in French. C. R. Acad. Sci., Paris, Ser. C, 271 (14):787-790, Oct. 5, 1970. 2 refs.
Jean Bricard, Michael Cabane, Guy Madelaine, and Dominique Vigla.
Identifiers: *Condensation, *Particulates, *Photolysis, France, Irradiation chambers, Nitrogen, Nitric oxide (no), Nitrogen dioxide (no2), Sulfur dioxide, Sulfur trioxide, Light radiation, Reaction mechanisms.

The mechanism of the formation of condensation particles through photolysis was studied by introducing small quantities of nitrogen dioxide, nitric oxide, and sulfur dioxide into a 200 stainless steel tank containing 99.998% pure nitrogen. The introduction of 2 cu cm NO2 per cu m N under irradiation by a mercury vapor light produced a maximum of 150,000 condensation nuclei in about 20 minutes. The introduction of 2 cu cm SO2 per cu m N into a mixture of 0.5 cu cm NO2 per cu m N resulted in the formation of several million particles per cu cm. This concentration did not decrease markedly until after 3 days of irradiation. Nitrogen dioxide by absorbing radiation of a wavelength below 3660 A dissociates to NO plus O. The reaction between nitrogen oxides and atomic oxygen produces solid mixed oxides. In the presence of SO2, atomic oxygen forms sulfur trioxide which explains the abundant particle formation.
APTIC-25564

ACOUSTIC SOUNDING--A NEW APPROACH TO THE STUDY OF ATMOSPHERIC STRUCTURE.

For primary bibliographic entry see Field 03.
APTIC-25622

ON THE STABILITY OF ACROLEIN TOWARDS PHOTO-OXIDATION IN THE NEAR ULTRAVIOLET.

Preprint, California Univ., Riverside Dept. of Chemistry and California Univ., Riverside, Citrus Experiment Station, 6p., 1960 (*). 4 refs.
A. D. Osborne, J. N. Pitts Jr., and E. F. Darley.
Identifiers: *Photolysis, *Aldehydes, Eye irritation, Smog, Acetic acid, Alcohols, Acetaldehyde, Acrolein, Ethylene, Carbon dioxide, Photooxidation, Ultraviolet radiation.

Acrolein was photolysed at 30 C and 2120 A in the presence and absence of light. Only trace amounts of product were formed. Quantum yields of ethylene and carbon dioxide were not more than 0.015 and 0.005, respectively. Under similar conditions, acetaldehyde gave appreciable amounts of carbon dioxide, peracetic acid, and methanol. The comparative stability of conjugated unsaturated aldehydes toward photochemical decomposition and oxidation makes it probable that they persist, if formed in Los Angeles smog, until dispersed. This may account for the persistence of eye irritation after dark when light-initiated smog formation has ceased. (Author abstract)
APTIC-25630

ATMOSPHERIC STRATIFICATION CHARACTERESTICS IN INVERSIONS.

(O kharakteristikakh stratifikatsii atmosfery pri inversiyakh). In: Investigation of the Bottom 300-Meter Layer of the Atmosphere. (Issledovanie nizhnego 300-metrovogo sloya atmosfery). N. L. Byzova (ed.), Moscow, Akademii Nauk SSSR, 1963. 4 refs. Translated from Russian by A. Moscona, Israel Program for Scientific Translations, Jerusalem, p. 43-47, 1965. NTIS: TT 65 50010
G. B. Mashkova.
Identifiers: *Inversion, Diurnal, Hourly, Ussr, Lower atmosphere, Anticyclones, Convection (atmospheric), Winds, Temperature (atmospheric), Radioactive radiation.

Based on observational data obtained in July 1961 on the proving ground of an upper-air mast, the magnitude and thickness of a radiational inversion layer displayed a satisfactory correlation with air-temperature amplitude, while the correlation between the thickness and the magnitude of the inversion was poor.
APTIC-25633

STEADY STATE AND NON-STEADY STATE DIFFUSION THEORY OF DROPLET GROWTH.

J. Rech. Atmospheriques, vol. 2:391-396, 1966. 10 refs. (Presented at the Symposium International sur les Noyaux de Condensation, 6th.)
J. C. Carstens, J. L. Kassner Jr., and J. L. Rivers.
Identifiers: *Nucleation, *Particle growth, *Droplets, Mathematical analyses, Simulation, Testing facilities, Ionization chambers, Diffusion, Clouds, Liquids.

The applicability of quasi-steady state theory of droplet growth to homogeneous and heterogeneous nucleation in a cloud chamber was investigated by constructing closed form solutions for the transient vapor and heat diffusion problem. Steady-state solutions using fine vapor and heat reservoirs were good approximations to the non-steady state solutions in most cases of practical interest. (Author abstract)
APTIC-25634

AN EXPERIMENTAL INVESTIGATION OF THE EFFECT OF AIR POLLUTION ON THE INITIATION OF RAIN.

J. Meteorol., 14 (3):272-280, June 1957. 10 refs.
Ross Gunn, and B. B. Phillips.
Identifiers: *Condensation (atmospheric), *Rain, *Nucleation, Testing facilities, Altitude, Clouds, Cooling, Particle growth, Water, Vapors, Reaction mechanisms.

Measurements in a giant expansion chamber show that the size of newly formed cloud droplets depends critically upon the cleanliness of the processed air. Droplets formed in ordinary air are small, but droplets large enough to precipitate are immediately formed by condensation whenever the condensation-nuclei density is sufficiently reduced. The product of mean drop mass and the activated nuclei density approximates the available free water per unit volume. Cloud droplets formed from polluted surface air are usually too small to precipitate, but large droplets formed overhead by condensation in sufficiently clean air may fall through the polluted cloud and initiate rain through association processes. Since the activated nuclei density is normally observed to decrease with increasing altitude, the probability of generating droplets sufficiently large to initiate rain increases as the vertical development of a cloud system increases. The population densities of large cloud droplets normally observed near the tops of precipitating clouds may be explained in terms of an overlying parcel of cooled air that is initially relatively free of nuclei. Since pollution is swept out of the atmosphere by diffusion onto cloud droplets, and by droplet movement, it is suggested that periods of general cloudiness and precipitation reduce the original nuclei density and permit the subsequently formed droplets to grow still larger, thus increasing the probability of appreciable precipitation. The rain producing cycle is, therefore, equipped with a feed-back or regenerative mechanism which normally proceeds, in a given mass of air, until the air is appreciably desiccated. Condensation nuclei as well as water vapor normally accumulate simultaneously in fair weather. The presence of nuclei may delay the initiation of precipitation until sufficient vertical instability can be established to lift or cool the relatively clean overlying layers. The precipitation cycle may then be re-established. The investigation shows that rain may be formed directly from the vapor in clean air, without the production of clouds. (Author abstract)
APTIC-25639

STATISTICAL PROCESSING OF DATA GATHERED BY THE RESEARCH REACTOR OF THE METEOROLOGICAL STATION IN MUNICH.

(Statistische Berabeitung der an der Meteorologischen Station beim Forschungsreaktor Muenchen gewonnenen Messdaten). Text in German. Munich Univ. (West Germany), Meteorologische Station beim Forschungsreaktor RR14, 60p. 37 refs.
Edgar Schoellmann.
Identifiers: *Munich, *Statistical analyses, *Meteorology, Area surveys, Research institutes, Diurnal, Monthly, Seasonal, Germany, Urban areas, Automatic methods, Computers, Data analysis, Ground level, Lower atmosphere, Middle atmosphere, Winds, Humidity, Precipitation, Pressure (atmospheric), Temperature (atmospheric), Weather forecasting.

Climatological data including air temperature, wet bulb temperature wind velocity, atmospheric pressure, vapor pressure and relative humidity, the latter 2 derived by calculation, gathered continuously and recorded every 6 minutes in 1962 and 1963 were statistically processed by computer methods used in meteorology and results were reproduced in tables, diagrams and textually. The data are expressed in the form of daily and monthly averages. Precipitation and sunshine are expressed in daily and monthly sums. Among the data processed are wind velocities and temperature differences at 2 and at 50 m above ground, idopleths of potential air temperature, tautochrons of potential air temperature, of wind velocity and of vapor pressure, cold measurement sums as indicators of the severity of winter and precipitation distribution in the Munich-Garching area. Included are tables and graphs of seasonal variations, of interdiurnal fluctuations of atmospheric pressure and similar data. The tables are designed to serve for purposes of applied meteorology.
APTIC-25645

THE DEPOSITION OF DUST PARTICLES FROM ELEVATED SOURCES.

Acta Geophys., Polon. (Warsaw), 15 (4):345-349, 1967. 7 refs.
Kazimierz Wojciechowski.
Identifiers: *Mathematical analyses, *Point sources, *Dusts, *Deposition, Continuous, Europe, Winds.

One of the main problems concerning air pollution is to find the concentration and the rate of deposition of small particles emerging from an elevated continuous point source. Various formulations of this problem are discussed with special reference to Clarenburg's formulas for particle deposition. The latter are based on the assumption that a cloud axis inclines in a horizontal direction due to gravity. Inconsistencies in the formulas are noted and corrected. The revised formulas presented consider also the influence of the vertical wind profile on particle deposition.
APTIC-25648

THE MAXIMA OF SUTTON'S EQUATION CORRECTED FOR DEPOSITION.

Health Phys., vol. 13:739-742, July 1967. 3 refs.
Y. Milman, and J. Tadmor.
Identifiers: *Diffusion models, *Transport, *Stack gases, Asia, Stacks, Height finding, Point sources.

A study was undertaken to find the distance which maximizes the diffusion equations, as a function of the height of release, and to find the height of release which, for a certain distance from the release point, would produce the maximum concentration at this distance. When depletion of the pollutant from a cloud by disposition during its travel from the point of release to a given distance was taken into account, the distance of maximum concentration was displaced nearer to the source as compared to the distance which maximizes Sutton's equation without considering deposition. Equations for heights of release and distances from point of release which maximize the concentration are derived, and a few numerical examples are presented. (Author abstract modified)
APTIC-25669

RECOMMENDED GUIDE FOR THE PREDICTION OF THE DISPERSION OF AIRBORNE EFFLUENTS.

Maynard Smith (ed.), New York, American Society of Mechanical Engineers, May 1968, 85p. 11 refs.
Personal Author Not Recorded.
Identifiers: *Stack gases, *Dispersion, Height finding, Mathematical analyses, Plume behavior, Meteorology, Stability (atmospheric), Topographic interactions, Turbulence (atmospheric).

The Recommended Guide for the Prediction of the Dispersion of Airborne Effluents has been prepared under the sponsorship of the American Society of Mechanical Engineers to bring together in a simple form as much as possible of the present-day technology of atmospheric dispersion. As such, it is intended as a guide for engineers concerned with stack effluents. Meteorological fundamentals include a discussion of wind, stability, and major influences on wind, stability, and turbulence. Behavior of airborne effluents includes the typical continuous stack source over local terrain, plume behavior as a function of initial source parameters, the influence of buildings and irregular terrain, and other source configurations. Simplifying assumptions, qualitative aspects of plume rise, and the mathematical treatment for calculation of effective stack height are discussed. Calculations of dispersion and deposition include the basic dispersion equation, maximum concentrations, inversion lids, inversion fumigations, multiple sources, volume sources, concentrations versus time, and deposition. Data for dispersion estimates, meteorological measurements, field tracer studies, and wind tunnel experiments are discussed. Computation problems, choice of calculation methods, and a worked example are included.
APTIC-25682

RISE AND GROWTH OF SPACE VEHICLE ENGINE EXHAUST AND ASSOCIATED DIFFUSION MODELS.

Geomet, Inc., Rockville, Md., Contract NAS8-24438, Rept. CR-61331, 207p., July 1970. 29 refs.
NTIS: N70-35855
Scott D. Thayer, Martin W. Chandler, and Roland T. Chu.
Identifiers: *Deposition, *Particulates, *Missiles and rockets, *Diffusion models, *Plume behavior, Engine exhausts, Combustion gases, Stacks, Statistical analyses, Ground level, Lower atmosphere, Middle atmosphere, Winds, Washout, Flow rates, Temperature.

Studies involving space vehicle plume rise and the development of diffusion models for normal and abnormal operations in the 5-30 km region of the atmosphere are presented for launches conducted at the Kennedy Space Flight Center. Films of the exhaust clouds from static rocket engine test firings are examined, and the data obtained are used in theoretical and statistical investigations to study the rise and growth of such clouds. A predictive model is developed to describe the diffusion and fallout of debris from rocket engine exhausts. The data on hot plume rise are unique in the field because they represent unusually high values of exhaust temperature and exit velocity. Diffusion model formulation involves the consideration of effects such as wind speed, directional shears on diffusion, transitions from one meteorological regime to another, and washout, as well as trajectory and source decay. A deposition model is derived which predicts the ground pattern resulting from the settling of material which can be assigned a terminal velocity.
APTIC-25685

DIFFUSION IN ANISOTROPIC FIELD OF TURBULENCE.

(Hitohosei ranryuba deno kakusan). Text in Japanese. Kogai (Hakua Shobo) (Pollution Control), 4 (5):249-253, Sept. 1969.
Koji Kitabayashi.
Identifiers: *Diffusion, *Turbulence (atmospheric), Continuous, Japan, Mathematical analyses, Testing facilities, Lower atmosphere, Point sources, Winds.

Diffusion from a continuous point source in the boundary layer in a wind tunnel was investigated. In the boundary layer, turbulence is usually anisotropic; especially in a wind tunnel boundary layer, wind shear is predominant. The diffusion equation given by Taylor (1921) was modified in order to describe the anistotropy of the turbulence field. The formula obtained for the lateral diffusion width at a given height from the continuous point source due to wind shear was used to compare the theoretical and experimental values. The experimental results show a diffusion pattern similar to the predicted pattern.
APTIC-25755

AEROSOL PREPARATION, GENERATION, AND ASSESSMENT. PROJECT HARE.

For primary bibliographic entry see Field 03.
APTIC-25760

ENVIRONMENTAL SIMULATION IN AIR POLLUTION CONTROL.

Preprint, National Air Pollution Control Administration, Raleigh, N. C. Div. of Meteorology, 20p., 1970. 20 refs. (Presented at the Meteorological Technical Exchange Conference, U. S. Naval Academy, Annapolis, Md., Aug. 21-24, 1970.)
George C. Holzworth.
Identifiers: *Alerts, *Air pollution forecasting, *Diffusion models, Control programs, Control agencies, Federal governments, Winds, Precipitation, Temperature (atmospheric), Inversion, Simulation.

The program that the National Air Pollution Control Administration (NAPCA) is following nationally to protect and enhance the quality of the Nation's air resources is reviewed. An important objective of NAPCA'S is curtailing pollutant emissions on an interim basis whenever necessary to prevent or alleviate the occurrence of episodes of high pollutant concentrations. The national air pollution potential forecasting service has been developed to advise of adverse meteorological conditions that have been associated with episodes of objectionable levels of air quality. These forecasts should properly be recognized as large scale guidance information whose usefulness can be enhanced considerably by refinements in terms of each particular local situation. The essential elements of the forecasting procedure are wind speed, temperature, vorticity, precipitation, mixing height, and ventilation. Two modifications to the forecasting service that would add greatly to its usefulness are an increase in the lead time of the forecasts, and provision of quantitative values of the meterological potential. An experimental effort toward the latter is being made along the lines of a simple model of dispersion over urban areas. (Author summary modified)
APTIC-25762

METEOROLOGICAL INSTRUMENTATION FOR AIR POLLUTION APPLICATIONS.

Analysis Instrumentation, vol. 6:21-28, 1968. 8 refs. (Proceedings of the Analysis Instrumentation Symposium, 14th Annual, May 19-22, 1968, Philadephia, Pa., Paper 68202.)
Harrison E. Cramer.
Identifiers: *Data handling systems, *Meteorological instruments, Stack gases, Stacks, Air pollution forecasting, Ground level, Lower atmosphere, Diffusion models, Plume behavior, Point sources, Transport, Winds, Turbulence (atmospheric).

Because of the broad time and space variability inherent in meteorological quantities and because of the large air volumes involved, the specification of meterological measurements for air pollution studies and control programs poses numerous problems. The various types of meteorological information required in these applications are described, examples of the data systems needed to satisfy these requirments are provided, and areas in which existing meteorological measurement techniques are deficient are pointed out. Generalized mathematical models used to predict ground-level concentrations downwind from a point source involve winds, turbulence, height of the source, mixing layer, strength of the source, and time. A schematic figure which illustrates the dilution and transport of pollutants from a stack is given. Meteorological data systems involve the au-

tomatic collection and processing of data provided by fixed or mobile sensors. Sample specifications for meteorological sensors are indicated. A meteorological data system in operation in Chicago, Ill. is described. The availability of remote sensing devices capable of routine measurements in the layer from 500 to 5000 ft would simplify the quantitative estimation of pollution hazard.
APTIC-25764

AIR POLLUTION LEVELS ASSOCIATED WITH A 49-HR INVERSION AT DETROIT-WINDSOR.

For primary bibliographic entry see Field 04.
APTIC-25784

BIBLIOGRAPHICAL STUDY OF THE ABSORBENT PROPERTIES OF OZONE IN THE ULTRAVIOLET RANGE.

(Etude bibliographique des proprietes
absorbantes de l'ozone dans le proche ultraviolet).
Text in French. Observatoire de Nice (France),
41p., 1969. 36 refs. CFSTI: N70-23432
Nicole Berruyer-Desirotte.
Identifiers: *Ultraviolet spectrometry, *Lower atmosphere, *Ozone, Diurnal, Seasonal, France, Balloons, Temperature (atmospheric).

A series of ultraviolet photographs of stars with a magnitude less than 10, conducted at the Nice Observatory in cooperation with the Space Astronomy Laboratory of Marseilles necessitated a study of the ozone content of various levels of the atmosphere, since ozone has the property of absorbing ultraviolet radiation in the range of wavelengths between 2000 and 6000 A. The atmospheric concentration of ozone varies according to latitude and longitude, according to the time of year, time of day, altitude, and air temperature. These variations are discussed in terms of their effect on the absorption of radiation. The study is seen as preparatory to observations from a balloon at an altitude of about 30 km, planned for October 1969. The ozone concentration between the altitudes of 25 and 35 km is extremely variable.
APTIC-25788

INFLUENCE OF CLIMATE AND TOPOGRAPHY ON OXIDANT AIR POLLUTION CONCENTRATIONS THAT DAMAGE CONIFER FORESTS IN SOUTHERN CALIFORNIA.

Preprint, 26p., 1970. 13 refs. (Presented at the
International Symposium of Forest Experts on
Fume Damage, 6th, Essen, West Germany, Sept.
7-11, 1970.)
Paul R. Miller, Morris H. McCutchan, and Bill C. Ryan.
Identifiers: *Oxidants, *Micrometeorology, *Topographic interactions, Diurnal, Trees, Los angeles, Forests, Mountains, Continuous monitoring, Altitude, Lower atmosphere, Meteorology, Convection (atmospheric), Winds, Sea breeze, Humidity, Inversion, Pressure (atmospheric), Temperature (atmospheric).

The concentration gradient of the total component of photochemical air pollution was measured from an urban basin east of Los Angeles up to the forested crest of nearby mountains. Four ground stations at elevations from 442 to 1725 m continuously monitored oxidant, temperature, relative humidity, and winds on a slope having two distinct vegetation zones. During June, July, and August 1969, the polluted air was confined below 1525 m until midday by a temperature inversion layer. Highest oxidant concentrations in the conifer forest occurred at 1600 PST following transport of polluted air upslope by convection currents and onshore breezes. At higher elevations, the daily oxidant maximum occurred later than the temperature and vapor pressure gradient maxima. The longest daily duration of oxidant above 10 pphm was at the 1725 m station in June and at the 817 m station during July and August. Oxidant measurements by aircraft in late June--early July consistently localized the greatest concentrations at 915 m next to the slope. The variable depth and inland penetration of the polluted layer of marine air and the extent of airflow up the mountain slope determine dosage of total oxidant received by vegetation in elevation zones. (Author abstract)
APTIC-25792

SENSING OF METEOROLOGICAL VARIABLES BY LASER PROBE TECHNIQUES. (FINAL REPORT).

Massachusetts Inst. of Tech., Cambridge,
Research Lab of Electronics, NASA Grant NGR
22-009-131, 11p., June 22, 1970. 47 refs. NTIS:
N70-35976
H. J. Zimmermann.
Identifiers: *Lasers, *Meteorology, Particulates, Aerosols, Dusts, Spectrometry, Altitude, Middle atmosphere, Upper atmosphere, Dispersion, Clouds, Scattering (atmospheric).

Based on analyses of the light scattered from a laser beam, measurement techniques have been developed for the remote sensing of meteorological variables. To detect layers of dust particles in the atmosphere, the optical backscattering cross section is measured as a function of range, and aerosol layers are inferred from significant deviations of the laser echoes. Echoes from scattering layers at heights of 60-90 km and 110-140 km were detected during the summer of 1963, and they were tentatively attributed to dust particles of extraterrestrial origin. Laser radar experiments were performed in Alaska and Sweden for the purpose of observing the aerosol content of the mesophere during noctilucent cloud displays. Further measurements near Oslo, Norway, indicated that the 60-70 km altitude region contained an appreciable amount of particulate matter in the summertime at high latitudes during periods of noctilucent cloud activity. A theoretical study of the meridional circulation of dust in the upper atmosphere was conducted, as well as a two-year study to evaluate the average and time-variant characteristics of stratospheric aerosols. Experiments have also been undertaken to perform spectral analyses of the light scattered from a laser beam by atmospheric molecules and aerosols. Some indications from these investigations are presented.
APTIC-25796

CONCERNING INDIRECT DETERMINATION OF THE REPEATABILITY OF LARGE-SCALE NEAR-GROUND INVERSIONS IN CITIES OF SIBERIA.

(K voprosu o kosvennom podschete
povteryaemosti moshchnykh prizemnykh inversiy
v gorodakh Siberi). Text in Russian. Tr. Nauchn.
Issled. Inst. Aeroklimatologii, 54 (4):55-60, 1968.
11 refs.
A. B. Lebedinskiy.
Identifiers: *Mathematical analyses, *Ground level, *Inversion, Ussr, Industrial areas, Air pollution forecasting, Winds, Weather forecasting.

Data on the repeatability of near-ground and 'hazardous' inversions as determined for a number of Siberian cities (Barnaul, Krasnoyarsk, Novosibirsk, Kolpashevo, Nizhneudinsk, Zhigalovo, Kurensk, and Erbogachen) are presented, together with the computational basis used for making these determinations. It is possible to make sufficiently accurate determinations of average and maximum repeatability of 'hazardous' inversions for locations with similar physicogeographic conditions using wind-vane data alone.
APTIC-25811

HYDROCHEMICAL STUDY OF ATMOSPHERIC PRECIPITATION.

(O gidrokhimischeskom izuchenii atmosfernykh
osadkov). Text in Russian. Sb. Rab. Gidrol., no.
8:67-81, 1968. 14 refs.
P. P. Voronkov.
Identifiers: *Chemical composition, *Snow, Ussr, Ammonia, Chlorine compounds, Hydrogen, Calcium compounds, Iron compounds, Magnesium compounds, Sodium compounds, Nitrates, Phosphates, Sulfates, Ions, Ph.

Data on the chemical composition of water derived from freshly fallen, accumulated, and wind-blown snow samples at a number of localities within the Soviet Union are tabulated and include the following: pH; hydrogen ion content; content of HCO (-), SO4 (--), Cl (-), NO3 (--), Ca (++), Mg (++), NH4 (+), and Na (+) ions; mineralization; color index; bichromate and permanganate oxidizability; phosphate content; and iron content. It is pointed out that detailed hydrochemical investigation of local fluctuations in precipitation make-up, and the underlying causes of these fluctuations, are essential to an understanding of the rather constant chemical composition of the so-called air ocean.
APTIC-25812

REGARDING THE EFFECT OF PHYSICOGEORGRAPHIC CONDITIONS ON THE CONCENTRATION OF INDUSTRIAL EMISSIONS INTO THE ATMOSPHERE.

(O vliyanii fiziko-geograficheskikh usloviy na
kontsentratsiyu promyshlennykh vybrosov v
atmosfernom vozdukhe). Text in Russian. Tr.
Nauchn. Issled. Inst. Aeroklimatologii, 54 (4):66-
74, 1968. 8 refs.
M. T. Zenin.
Identifiers: *Pollutants, *Micrometeorology, *Topographic interactions, Annual, Ussr, Industrial areas, Combustion gases, Dusts, Soot, Air quality measurements, Sulfur dioxide.

A study of the relationship between microclimatic conditions (especially terrain and vegetation) and industrial air pollution (dust, soot, sulfur dioxide, and other gaseous pollutants) in an unidentified city in western Siberia is reported. The various sampling sites are classified on the basis of relief and degree of impervious cover. A chart showing a comparison between average annual pollution levels in the vicinity of an industrial source and actual concentrations at a specific time is used to point up the significance of smalle-scale changes in climatic conditions, and the need for a microclimatic approach to the problem.
APTIC-25813

TVA AIR POLLUTION STUDIES PROGRAM.

Air Repair, 4 (2):59-64, Aug. 1954. 8 refs.
Fred W. Thomas.
Identifiers: *Plans and programs, *Steam plants, *Tva, Mobile, Portable, Fly ash, Stacks, Lead peroxide candle, Monitoring, Height finding, Sulfur dioxide, Dispersion, Winds.

Air pollution studies at Tennessee Valley Authority steam plants are divided into two parts: preoperational and post-operational. The first phase provides base-line information against which actual plant operation can be checked; it includes obtaining meteorological data where little or no weather data are available and the collection and chemical analysis of samples from selected trees in the area. Post-operational studies include continued meteorological observations, analysis of plant operating data, routine monitoring, biological surveys, and special studies on dispersion. These special studies have led to a method for estimating effective stack height and critical wind speed, modification of a portable Titrilog for mobile monitoring, adoption of lead peroxide cylinders as a practical and economic means of approximating cumulative SO2 activity at any point, and the development of deposit gauges that classify fly ash according to source direction.
APTIC-25815

THE RISE OF BOUYANT CLOUDS.

Associated Universities, Inc., New York, 19p.,
May 1970. 35 refs. NTIS: BNL 50244 (T-579)
J. A. Frizzola, I. A. Singer, and M. E. Smith.

Identifiers: *Fuels, *Missiles and rockets, *Plume behavior, Open burning, Photographic methods, Lower atmosphere, Meteorology, Clouds, Inversion, Lapse conditon, Turbulence (atmospheric), Heat transfer.

The open burning of rocket propellant fuel served as a source of buoyant clouds the dimensions of which were measured photographically and visually. Repeated experiments produced consistent cloud behavior during temperature inversions, while showing the expected variability during lapse conditions. Analyses of the time and space history of the cloud tops established the usefulness of a method for distinguishing the initial cloud behavior from the subsequent expansion of the cloud caused by ambient turbulence. Since the heat release, cloud behavior, and meteorological factors were known, it was possible to study their interrelation and to make comparisons with theory. (Author abstract)
APTIC-25819

REAL TIME SIMULATION OF ATMOSPHERIC BALLOON ENVIRONMENT.

Office National D'Etudes et de Recherches
Aerospatiales, Toulouse (France), Dept. D'Etudes
et de Recherdhes es Technologie Spatiale, Rept.
NT-03-5-70, 17p., May 1970. 5 refs. NTIS: N70-35302
M. Roussel, and A. Paillous.
Identifiers: *Controlled atmospheres, *Balloons, *Simulation, France, Computer programs, Testing facilities, Irradiation chambers, Pressure (atmospheric), Temperature (atmospheric), Solar radiation, Ultraviolet radiation.

A simulation chamber was built to study the behavior of several balloon materials during long time flights. Solar ultraviolet radiation, pressure, temperature and atmospheric composition are the simulated constituents of the atmospheric balloon environment. Samples are irradiated without mechanical strain. A computer program, taking into account the values of different solar and plastic material parameters against wavelength, gives the information for conducting the simulation. Experiments are performed in real-time. Exact ultraviolet energy doses in each spectral wavelength interval between 300 an 410 nm are delivered every day to samples. A night-day cycle is simultaneously achieved with a thermal cycle. (Author abstract modified)
APTIC-25823

INTERMITTENT AIR POLLUTION EPISODE IN NEW YORK CITY, 1962.

For primary bibliographic entry see Field 07.
APTIC-25829

TRANSVERSE JET PLUME. (TECHNICAL PROGRESS REPORT).

New York, Univ., N. Y., Geophysical Sciences
Lab., AEC Contract AT (30-1)-3673, NYU Rept.
GSL TR-70-4, 27p., Jan. 1970. NTIS: NYU 3673-4
James Halitsky, and Edward J. Kaplin.
Identifiers: *Mathematical modeling, *Plume behavior, *Turbulence (atmospheric), Stacks, Simulation, Testing facilities, Winds.

Wind tunnel tests were conducted to measure transverse-jet plume concentrations in a low-turbulence, steady air stream. Test parameters were emission velocity ratio and inclination of stack to the wind. About 4000 individual concentrations were measured at three longitudinal stations by means of a distilled-water impingement technique developed for field tests, but with sample time reduced from 30 min to 14 min. Preparatory work for these tests included manufacture of a support rig for holding multiple sample probes, design and construction of a recording ohmeter for rapid impinger analysis, and development of a new calibration curve for the shorter sampling period. The data have been reduceo to contours of uniform concentration at each station. The tunnel data are being incorporated into a mathematical model for calculating time when jet-plume concentrations in a turbulent wind, using low-turbulence wind data. If successful, this treatment will enable a single set of measurements, taken under closely controlled conditions, to be used for generating a mean plume for any arbitratily specified atmospheric wind turbulence condition. (Author summary modified)
APTIC-25831

THE USE OF RADIOACTIVE TRACERS IN QUANTITATIVE STUDIES OF MOVEMENTS OF THE ATMOSPHERE.

(Ispol'zovaniye radioaktivnykh izotopov dlya
kolichestvennogo izucheniya dvizheniy
atmosfery). Text in Russian. Proceedinges of the
United Nations International Conference on the
Peaceful Uses of Atomic Energy, 3rd, Geneva,
Switzerland, 1964, p. 28-36. 13 refs.
I. L. Karol, S. G. Malakhov, V. D. Vilenskii, G. V.
Dmitriyeva, and Yu. V. Krasnopevtsev.
Identifiers: *Measurement methods, *Altitude, *Atmospheric movements, *Radioactive tracers, Ussr, Mathematical analyses, Diffusion, Tracers, Precipitation, Gases.

Methods were developed for determining a number of parameters entering into the quantitative description of certain atmospheric processes. The vertical turbulent diffusion factor, K2, in the lower troposphere was estimated from measurements of the concentration of radon and its short-lived decay products; that in the stratosphere was estimated from measurements of radium D (Pb210). The values of K2 obtained were used to work out the mean velocity of exchange through the tropopause and between the stratospheres of the northern and southern hemispheres. The mean value of the radioactive aerosol washout rate by clouds and precipitation from the tropopause was found by measuring the ratio of radon and its long-lived daughter products in the ground air to that in precipitation, taking into account the vertical turbulent diffusion of the aerosol in the troposphere. In addition, measurements of radon and radium D, and also of artificial tracers, in ground air were used in synoptic studies of air exchange in the tropical zone and of the conditions under which stratospheric air penetrates into the ground layer in temperature latitudes. (Author abstract modified)
APTIC-25842

AREA METEOROLOGY.

Arch. Environ. Health, vol. 5:477-486, May 1962. 6 refs.
Leonard Greenburg, and Franklyn Field.
Identifiers: *Air pollution episodes, *New york city, *Anticyclones, *Inversion, Morbidity, Mortality, Health impairment, Meteorology, Winds, Humidity, Temperature (atmospheric), Stability (atmospheric), Stagnation.

Incidents of unusual air pollution wherein inversion phenomena have played an important role have in the past generally been regarded by non-meteorologists as local in character. An analysis of the meteorology which resulted in an air pollution incident in New York City in November, 1953, clearly indicates that the weather conditions present during this period influenced a very large area, in fact thousands of square miles. This persistent meteorological pattern of a stagnating anticyclone brought inversion conditions to most of the eastern third of the U. S. The most intense impact was felt from southern New England to Maryland and Delaware and as far west as central Pennsylvania. It appears reasonable to conclude that adverse meteorological conditions such as temperature inversions, humidity, winds, sunshine, and stability, associated with anticyclones resulting in intense air pollution may affect mortality and morbidity over much greater areas than have usually been considered up to the present time. In the study of air pollution, consideration should be given to the total area involved. This will require a greater degree of cooperative effort among all pertinent disciplines studying such problems. The total effects of air pollution on health because of the possible widespread meteorological impact may be far greater than previously suspected from epidemiological studies. (Author conclusions modified)
APTIC-25855

SIMULATION OF PHOTOCHEMICAL REACTION IN POLLUTED AIR.

(Osen taikichu deno kokagaku hanno no
shimyureshon). Text in Japanese. Seikatsu Eisei
(J. Urban Living Health Assoc.), 14 (3):69-75, June
20, 1970. 30 refs.
Takashi Nakadoi.
Identifiers: *Simulation, *Ionization chambers, *Photochemical reactions, Japan, Smog, Design criteria, Research methodologies, Nitric oxide (no), Flow rates.

Basic research necessary for simulating photochemical reactions in polluted atmospheres in a laboratory chamber was conducted; the design of the chamber is outlined. Care must be taken in designing the chamber on such points as method of introduction of pollutants into the chamber; system of letting in or out clean air; size and material of the chamber; gauges and measurement of pollutants; and the light source. The size of the chamber is determined by whether or not pollutants are introduced into the chamber statically or kinetically and the analysis sensitivity of the gauges, which ranges from 1.5 l to 30 cu m. The static type requires 10 to 30 cu m. The kinetic type utilizes stirring and not just circulating. The static chamber requires a system through which clean air is introduced, but it needs only a single introduction of pollutants; in the case of the kinetic method, small amounts of pollutants must be sent into the chamber constantly. In the static method, the initial pollutant diminishing rate can be expressed in terms of the total amount of sample, time, and volume of the chamber. Also, after one reaction test, the polluted air in the chamber must be replaced with clean air. It takes 0.1 cu m/min, i.e., for 10 cu m air it takes about 8 hours for 99% replacement. With the kinetic method, the nitric oxide diminishing rate can be expressed in terms of the flow speed into the chamber, volume of the chamber, concentration of NO introduced, and concentration of NO at steady state. The experiment being conducted using a 382-liter stainless steel chamber is claimed to be of practical value in studying the possibility of the smog formation in big cities.
APTIC-25887

THE GLOBAL CIRCULATION OF ATMOSPHERIC POLLUTANTS.

Sci. Am., 224 (1):32-42, Jan. 1971.
Reginald E. Newell.
Identifiers: *Transport, *Weather modification, Monitoring, Precipitation, Temperature (atmospheric), Carbon dioxide, Carbon monoxide, Ozone, Sulfur compounds, Water, Vapors.

Man-made trace gases are discussed with respect to how they enter the atmosphere, the speed and extent of their spread, and the ways in which they may alter the atmosphere and thus affect temperature and precipitation, both locally and worldwide. The gases are ozone, carbon monoxide, carbon dioxide, water vapor, sulfur, and nitrogen. Now that these important trace substances are being introduced into the atmosphere by man at rates comparable to those in the natural cycle, it is appropriate to start collecting data on them. Opportunities to do so are provided by commercial airline flights, regular ocean voyages as well as special oceanographic cruises, the Atomic energy commission balloon network, surface-to-air sampling networks established to monitor global radioactivity levels, and mountaintop observatories.
APTIC-25907

AN ANALYSES OF TURBULENCE STATISTICS AT FORT WAYNE, INDIANA.

J. Appl. Meteorol., 7 (1):90-93, Feb. 1968. 1 ref.
I. R. Graham.
Identifiers: *Fort wayne, *Winds, *Turbulence atmospheric, Canada, Indiana, Non-urban areas, Urban areas, Ground level, Lower atmosphere, Atmospheric movements, Topographic interactions, Turbulence (atmospheric).

Published measurements of wind speed, wind direction, and turbulence levels made at Fort Wayne, Indiana, provide a basis for an analysis of mesoscale variations over the Fort Wayne area. Average values of data from Vector Vane and Climet instruments at surface and tower locations are presented. Urban effects on wind flow include increased turbulence levels and a reduction in wind speed. For the case of a northwest wind, wind speeds are less, but turbulent levels tend to be about twice as high at surface stations within the city as at rural stations in the upwind direction. Comparison of data from towers at the upwind edge of the city and in the downtown area indicates that the modified wind structure extends to some height above the city surface. Isopleths of standard deviation of azimuth angle are drawn on a map of the Fort Wayne area. (Author abstract modified)
APTIC-25916

THE THEORETICAL CALCULATION OF THE DISTRIBUTION OF PHOTOCHEMICALLY-FORMED OZONE IN THE ATMOSPHERE.

Terr. Magn. Atmos. Elec., vol. 41:299-310, 1936. 19 refs.
Oliver R. Wulf, and Lola S. Deming.
Identifiers: *Mathematical analyses, *Dispersion, *Ozone, Altitude, Lower atmosphere, Oxygen, Photochemical reactions, Solar radiation.

An expression is derived for the distribution of height of atmospheric ozone, assuming it to exist in an undisturbed photochemical steady state under the unfluence of solar radiation considered as that of a black body at 6000 K. Approximate values for all the quantities occurring in the expression are either known or computed, with the exception of a numerical constant which is determined from the known total amount of atmospheric ozone. Based on existing photochemical data, the magnitude of the constant is reasonable. The distribution of ozone obtained by the method closely approximates concentrations known to exist in the atmosphere. The nature of this distribution strongly influenced by values of the absorption-coefficient of ozone and oxygen in the region where the two absorption meet, namely 2200 A. (Author summary modified)
APTIC-25924

USE OF ROUTINE METEOROLOGICAL OBSERVATIONS FOR ESTIMATING ATMOSPHERIC DISPERSION.

Nucl. Safety, 2 (4):47-51, June 1961. 9 refs.
F. A. Gifford Jr.
Identifiers: *Mathematical analyses, *Dispersion, *Stability (atmospheric), *Radioactive radiation, Reactors (nuclear), Plume behavior.

Based on the generalized Gaussian dispersion formula, methods are presented for estimating the vertical dispersion and the horizontal dispersion coefficients for a cloud or plume (as a function of distance from the source) under neutral meteorological conditions and different degrees of stability and unstability. The use of dispersion estimates should be desirable in both nuclear reactor safety studies and other air pollution problems.
APTIC-25935

DEFLECTION OF A JET INJECTED INTO A STREAM.

J. Eng. Phys. (English translation from Russian of: Inzh. Fiz. Zh.), 8 (2):160-163, Feb. 1965. 9 refs.
Ya. M. Vizel, and I. L. Mostinskii.
Identifiers: *Mathematical analyses, *Plume behavior, *Winds, Ussr.

A solution is given for the deflection of the axis of two-dimensional and circular jets by an entraining stream. Design formulas are obtained and compared with experimental data. Agreement between theory and observations is considered quite satisfactory. (Author abstract modified)
APTIC-25942

A MODEL OF GLOBAL CLIMATE AND ECOLOGY.

Preprint, Simulation Councils, Inc., La Jolla, Calif. and University of Southern California, Los Angeles, 20p., Sept. 1970. 30 refs. (Presented at the National Invitational Seminar on Advanced Simulation, Sept. 24-26, 1970.) NTIS, DDC: AD 711498
William R. Graham, and Michael Warshaw.
Identifiers: *Micrometeorology, *Simulation, *Biosphere, Oceans, Meteorology, Winds, Humidity, Precipitation, Temperature (atmospheric), Carbon dioxide.

A model of the relationships between the biosphere and man's activities is presented, based on the assumption that climate is the central mechanism through which man's activities and the biosphere interact on a global scale. The climate is described by the statistical distributions over some time and space scale of variables such as temperature, humidity, precipitation, and surface wind. A coupled ocean-atmosphere model is discussed in terms of the conservation of momentum, energy, and matter, carbon dioxide; and time span of climatic calculations. Man's biological and nonbiological energy requirements are discussed, as well as the effect of climate on the biosphere.
APTIC-25947

CALCULATION OF PRECIPITATION SCAVENGING OF PARTICULATES AND GASES FROM THE ATMOSPHERE.

Nucl. Safety, 7 (3):354-364, Spring 1966. 45 refs.
R. J. Engelmann.
Identifiers: *Precipitation, *Scavenging, Particulates, Mathematical analyses, Rain, Snow, Washout, Stability (atmospheric), Gases.

A firm basis for calculations of precipitation scavenging of particulates and gases from the atmosphere and a guide to quantitative predictions are presented. Collection efficiencies, washout coefficients for particles and gas, rain spectra, and washout by snow are discussed, and values are given, including some for previously unpublished material. Extensive 'area within a washout isopleth' charts are shown for three atmospheric stabilities and several washout coefficients. (Author abstract)
APTIC-25951

INVESTIGATION OF ATMOSPHERIC TURBULENCE BY MEANS OF THE M-27 BRIDLED-CUP ANEMOMETER.

(Issledovanie atmosfernoi turbelentnosti a pomoshchyu zatormozhennogo anemometra M-27). In: Investigation of the Bottom 300-Meter Layer of the Atmosphere. (Issledovanie nizhnego 300-metrovogo sloya atmosfery). N. L. Byzova (ed.), Moscow, Akademii Nauk SSSR, 1963. 3 refs. Translated from Russian by A. Moscona, Israel Program for Scientific Translations, Jerusalem, p. 48-56, 1965. NTIS: TT 65 50010
V. N. Ivanov.
Identifiers: *Anemometers, *Turbulence (atmospheric), Diurnal, Ussr, Lower atmosphere, Dispersion.

Though bridled-cup anemometers of the M-27 type are sturdy and reliable enough to be used in stationary measurements of turbulence in the lower atmospheric layer, it has not been clear what turbulence characteristics could be measured with these wind gauges. As experimentally determined, the anemometer can be used to obtain profiles as well as daily variations of the turbulent energy of the longitudinal velocity component and also statistical turbulence characteristics such as the dispersion or correlation function. A method is presented for correcting for errors in correlation or dispersion measurements that result from the gauge's dependence on velocity. Effects of frequency response on the spectrum of the longitudinal velocity component are eliminated by use of a filter or by reduction of the transmission band.
APTIC-25978

LABORATORY SIMULATION OF THE ATMOSPHERIC BOUNDARY LAYER.

Preprint, American Inst. of Aeronautics and Astronautics, New York, 11p., 1970. 38 refs. (Presented at the AIAA Fluid and Plasma Dynamics Conference, 3rd, Los Angeles, Calif., June 29-July 1, 1970, Paper 70-751.) NTIS, DDC: AD 710250
J. E. Cermak.
Identifiers: *Atmospheric boundary layer, *Simulation, *Winds, Urban areas, Dispersion, Meteorology, Temperature (atmospheric), Topographic interactions, Turbulence (atmospheric).

Similarity criteria are given for micro-, small-, and meso-scale motion of the atmospheric boundary layer. Requirements for simulation of dispersion of passive contaminants in the atmosphere are discussed. The characteristic features of a unique meteorological wind tunnel having a capability for simulating thermally stratified boundary layers are described. Mean wind speed, mean temperature and turbulence statistics measured in this laboratory facility are found to be similar to corresponding data obtained from measurements in the atmosphere. Examples of simulated dispersion over a variety of surface features including urban areas and complex topography are described. (Author abstract)
APTIC-25981

PEROXYACYL NITRATES.

In: Project Clean Air. California Univ., Berkeley, Task Force 7, Vol. 4, p. 4-1 to 4-9, Sept. 1, 1970. 44 refs.
James Lewis.
Identifiers: *Reaction mechanisms, *Peroxyacetyl nitrate, Toxicity, Smog, Hydrocarbons, Nitric oxide (no), Nitrogen dioxide (no2), Ozone, Hyrolysis, Photooxidation, Free radicals, Ultraviolet radiation.

Based on existing knowledge, peroxyacyl nitrates are discussed with regard to their structure, identification, synthesis, formation in the atmosphere, and biological effects. Atmospheric formation of PAN follows irradiation of a mixture of oxygen and nitric oxide and hydrocarbon, leading to oxidation of nitric oxide to nitrogen dioxide with concomitant consumption of hydrocarbons. Ozone and PAN, whose production involves free radical reactions, appear only after all the nitric oxide is consumed. Although PAN formation remains insignificant if hydrocarbons are kept below the level sufficient for total conversion to NO, there are doubts as to the accessibility of such a favorable hydrocarbon-NO ratio in the atmosphere. PANS may be toxic through at least three effects: their oxidizing properties as peroxides, their acetylating properties as anhydrides, and the toxicity of the nitrite release on hydrolysis.
APTIC-25982

COLLISION-RATE THEORY AND THE COAGULATION OF FREE-MOLECULE AEROSOLS.

J. Appl. Phys., 36 (6):1857-1862, June 1965. 12 refs.
J. R. Brock, and G. M. Hidy.
Identifiers: *Collision-rate theory, *Particle growth, Aerosols, Particle size, Mathematical analyses, Thermal radiation, Electric charge.

Collision-rate theory is used to describe the collision and coagulation of aerosols moving in the free-molecule regime where the particle diameter is small compared to the mean free path of the suspending gas. A general expression is obtained

for the rate of collision between particles. This relation accounts for the directing influences of the electrical charging of the particles, external fields of force, and nonuniform states in the suspending medium, including surfaces of discontinuity. Results of the free-molecule theory for thermal coagulation do not agree with the classical theory which has been corrected for the effects of large values of the ratio of the mean free path of the suspending gas to the particle diameter. In addition, the free-molecule results indicate that the directing effects can substantially increase the coagulation rate, even for aerosol particles of small size. (Author abstract)
APTIC-25984

A PRACTICAL, MULTIPURPOSE URBAN DIFFUSION MODEL FOR CARBON MONOXIDE. (FINAL REPORT).

Stanford Research Inst., Menlo Park, Calif.,
NAPCA Contract CPA 22-69-64, and Coordinating
Research Council Contract CAPA-3-68, SRI Proj.
7874, 194p., Sept. 1970. 65 refs. NTIS: PB 196003
F. L. Ludwig, Warren B. Johnson, Albert E.
Moon, and Robert L. Mancuso.
Identifiers: *Diffusion models, *Carbon monoxide, Diurnal, Hourly, Urban areas, Winds, Stability (atmospheric).

The development and current status is described of a receptor-oriented diffusion model that can be applied to urban areas to give the following outputs: carbon monoxide concentration isopleths for a given set of meteorological conditions and times of day; sequences of hourly CO concentrations; and climatological summaries of CO concentration for specific locations if a historical record of meteorological data is available. The model can be used to obtain the frequency distributions of concentrations averaged over various time intervals for specific hours of the days or days of the week. Model inputs are traffic volume on major streets and highways in the urban area, atmospheric stability, mixing depth, and wind speed and direction. Methods are described for obtaining atmospheric stability and mixing depth from conventional (i.e., airport) hourly meteorological measurements and twice daily radiosonde data. The concentrations calculated with the model are compared with observations of CO concentrations from Continuous Air Monitoring Program (CAMP) stations. Although the agreement is not good (the model generally calculates concentrations lower than those observed), improvement is obtained by empirical corrections. (Author abstract modified)
APTIC-25995

ST. LOUIS DISPERSION STUDY. VOLUME I. INSTRUMENTATION, PROCEDURES, AND DATA TABULATIONS.

National Air Pollution Control Administration,
Durham, N. C., Consumer Protection and
Environmental Health Service. APTID Rept. 68-
12, 359p., Aug. 1968. 17 refs. NTIS: PB 194765
James L. McElroy, and Francis Pooler Jr.
Identifiers: *St louis, *Dispersion, Instrumentation, Tracers, Transport.

The St. Louis Dispersion Study was designed to describe atmospheric transport and diffusion over an urban area, as determined by analyses of the behavior of airborne tracer material released at a point source. A total of 43 experiments, including a test run, were conducted in seven series in urban St. Louis between May 1963 and March 1965. Part I of this volume describes the field sites, dissemination and sampling equipment, meteorological equipment, and operating procedures. Part II presents tabulations of the diffusion and meteorological data collected during the study. (Author abstract modified)
APTIC-25997

AN URBAN-CLIMATOLOGICAL STUDY OF THE ATTENUATION OF SOLAR RADIATION BY AIR POLLUTION IN TOKYO.

(Taikisoen ni yoru nissharyo gensho no toshi
kikogakuteki kenkyu--Tokyo no bawai--Dai 1 po).
Text in Japanese. Chirigaku Hyoron (Geograph.
Rev. Japan), 43 (5):285-296, May 1970. 20 refs.
Shuji Yamashita.
Identifiers: *Tokyo, *Micrometeorology, *Solar radiation, Urban areas, Suspended particulates, Dispersion, Sea breeze, Temperature (atmospheric).

Continuous observations of insolation were carried out using Epply's pyrheliometer in the midtown area and the suburbs of Tokyo for a period of one year from August 1967 through July 1968, cloudless days observed are discussed. The insolation reaching the horizontal surface was about 70% of the value of the top of the atmosphere in suburban Tateno and Asaka which were presumed to have no air pollution. It was about 60% at the Aerological Observatory and in Joto in the city. Cloudless days may be classified into three types according to the type of wind: sea breeze, northerly wind, and southerly wind. The reduction index of insolation of the midtown area of Tokyo, computed using the formula: R equals (Io-Ii)/Io times 100 where Io is the insolation at Tateno; and Ii, the insolation at each site of observation in Tokyo was about 14% in case of sea breeze, about 7% by northerly wind, and about 1% by southerly wind. The reduction index appears largest during the sea breeze, followed by the northerly wind. This is thought to be due to the fact that suspended particles blown over the sea by the northerly wind are driven back again to the land by the sea breeze, without being diffused, resulting in a further advance of air pollution. Differences were observed between the reduction index of Sundays and holiday (5%) and that of weekdays (10%). In the midtown area, since the amount of heat lost by evaporation was small, the maximum temperature was higher than in the surrounding areas but was lowered when air pollution was marked, due to shutting off of insolation. An accurate observation of the seasonal changes of insolation throughout the year was not possible becasue of the seasonal maldistribution of the number of selected days.
APTIC-26059

OXYGEN-18 VARIATIONS IN ATMOSPHERIC CARBON DIOXIDE: THE HASL DATA.

J. Geophys. Res., 75 (9):1723-1726, March 20,
1970. 7 refs.
H. Craig, and F. Begemann.
Identifiers: *Oxygen-18, *Altitude, *Carbon dioxide, Germany, Lower atmosphere, Middle atmosphere, Humidity, Oxygen, Isotopes.

For the past 15 years, the United States has conducted a global program of atmospheric carbon dioxide studies in the troposphere and lower stratosphere, including measurements of carbon-14, carbon-13, and oxygen-18 variations. These HASL data show oxygen-18 values that are much lower than those previously found by the authors, an average of about -5% as compared to between zero and plus 1.5%. Furthermore, in addition to a slight dependence on latitude of collection, the data show a strong variation with altitude, with a pronounced minimum in oxygen-18 content at around 5 km, at least at 40 deg S the only latitude for which samples from below 5 km have been analyzed. The HASL samples under discussion were collected aboard aircraft by compressing air into steel bottles to a pressure of about 200 atm. The bottles were not evacuated prior to sampling, and hence the samples contain 1 atm of ground-level air added to them. Upon compression, the water vapor in the samples will condense to liquid, at least in the samples collected below about 10 km where there is sufficient moisture present. For the ones from higher up, condensation will depend on the humidity of the ground-level air, the temperature and moisture content of the steel bottles, and the possible existence of a liquid film on the walls. Whenever condensation of the moisture occurs, oxygen isotopic exchange between CO2 and water will take place, and it is the oxygen-18 content after equilibration that is being measured. However, the data do provide some indication that the humidity of the stratosphere may be nearly constant above 15 km.
APTIC-26077

THE IONS OF THE TROPOSPHERE: THEIR INTERACTIONS WITH AEROSOLS AND THE GEOELECTRIC FIELD.

Catholic Univ. of America, Washington, D. C.,
Thesis (Ph.D.), Ann Arbor, Mich., Univ.
Microfilms, Inc., 1968, 103p. 77 refs.
William Albert Hoppel.
Identifiers: *Aerosols, *Electricity (atmospheric), *Ions, Measurement methods, Particulate classifiers, Experimental equipment, Mathematical analyses, Testing facilities, Lower atmoshpere, Diffusion, Nucleation, Particle growth, Vapors.

A study was undertaken to investigate the properties of tropospheric ions and to correlate these properties with theory. Macroscopic coefficients appearing in the governing equations must be related to the microscopic properties of the ions, molecules and aerosols; and secondly, the macroscopic equations must be solved with appropriate boundary conditions. The ionic balance in the troposphere, mobility theory, the nature of the tropospheric ions, and the recombination of ions are discussed. Theories of the diffusion of ions to aerosols are reviewed, general assumptions are justified, and three-body trapping is included. The mobility of atmospheric ions is measured with a converging channel chamber. Instrumental techniques are reviewed, as well as tropospheric measurements. A definite change in the mobility distribution was observed with the addition of both water vapor and Aitken nuclei. The macroscopic problem of fair weather atmospheric electricity is solved when the magnitudes of the ion densities and the vertical geoelectric field are specified at each point in space. The theory of the nonturbulent electrode effect in aerosol free air is discussed, as well as the theory of the electrode effect in contaminated air.
APTIC-26080

EXPERIMENTAL AIR QUALITY FORECASTS IN THE SACRAMENTO VALLEY.

Weather Bureau, Salt Lake City, Utah, ESSA-.
WBTM-WR-53, 17p., Aug. 1970. 10 refs. NTIS:
PB 194128
Norman S. Benes.
Identifiers: *Air pollution forecasting, *Ventilation, California, Smokes, Open burning, Visibility, Winds.

Rice-straw burning in the Sacramento Valley generally produces a highly visible smoke which, under certain atmospheric conditions, affects air quality and visibility in the area. In response to a request from private citizens, the Sacramento Weather Bureau Office initiated an advisory air quality forecast program based on a 'ventilating index' concept. Forecast terminology was kept simple, as was the method of preparation. Wind observations from a TV tower were used and a temporary meso-scale network of visibility observation stations was set up. Verification of the forecast by category, that is, 'Poor', 'Fair', 'Good', or 'Excellent', for the 1968 and 1960 fall seasons was good. However, the simple methods used to estimate atmospheric ventilation qualities may not suffice for more complex future requirements. When legal constraints are added to the strict California ambient air quality standards, more pertinent data may be required than that used in this experiment.
APTIC-26088

AIR POLLUTION CAUSED BY AGRICULTURE AND FORESTRY: PESTICIDES.

For primary bibliographic entry see Field 01.
APTIC-26093

INTERMEDIATE REPORT OF STUDY ON AIR POLLUTION CAUSED BY AUTOMOBILE EXHAUST GAS.

Text in Japanese. Nippon Kikai Gakkai Shi (J. Japan Soc. Mech. Engr. Tokyo), 73 (623):11-15, Dec. 1970.
Personal Author Not Recorded.
Identifiers: *Computer programs, *Air pollution forecasting, Japan, Urban areas, Automotive emissions, Vehicles, Mathematical analyses, Diffusion, Topographic interactions.

A comprehensive research program was undertaken by a study group of the Japan Society of Mechanical Engineers with the immediate objective to establish a theoretical model which could result in effective anti-pollution measures. Various factors such as traffic, city structure, and local weather conditions are analyzed and programmed for a computer. Thus, an integrated application of traffic movement theory, engine operation parameters, and air diffusion theory will result in the exhaust gas concentration. When the Air Pollution Prediction System was compared with actual values, satisfactory agreement was found.
APTIC-26102

DIFFUSION OF SMOKE FROM A HIGH STACK.

Phys. Fluids Suppl., 10 (9):S267-S269, 1967. 8 refs.
Mikio Hino, Masao Homma, and Toshio Senshu.
Identifiers: *Smokes, *Electric power production, *Diffusion, Japan, Stack gases, Stacks, Radiation measuring systems, Anemometers, Balloons, Ground level, Lower atmosphere, Tracers, Stability (atmospheric), Turbulence (atmospheric), Radioactive tracers.

Experiments on smoke diffusion from high stacks of thermal electric power stations indicate that the maximum time-average gas concentration at ground level decreases within a range of sampling times from 1 to 5 hr, inversely proportional to the 1/2 power of the sampling time as predicted from turbulence theory by Inoue, Ogura, and Hino. The structural height of the stack was 150 m, but the effective height due to buoyancy and momentum rise was 300 to 450 m. A method of radio-activation analysis of tracer particles was developed, and meteorological data up to 500 m were obtained by means of two moored balloons, as well as pilot balloons and anemometers. The diffusion formulas generally used give a higher estimation of ground-level concentration than the observed. The height of the atmospheric surface boundary layer is greatest at neutral condition, becoming less with a deviation from neutral to stable or unstable stratif-ication of the atmosphere. (Author abstract modified)
APTIC-26141

ACOUSTIC METHODS FOR THE REMOTE PROBING OF THE LOWER ATMOSPHERE.

For primary bibliographic entry see Field 03.
APTIC-26150

PRECIPITATION CHARACTERISTICS: SHIPBOARD MEASUREMENTS IN THE CARIBBEAN SEA.

In: Pacific Northwest Laboratory Annual Report for 1968 to the USAEC Division of Biology and Medicine. Volume II: Physical Sciences. Part 1. Atmospheric Sciences. Battelle Northwest, Richland, Wash., Environmental and Life Sciences Div., p. 26-29, Nov. 1969. 6 refs. CFSTI: BNWL-1051, Part 1.
M. Terry Dana.
Identifiers: *Caribbean sea, *Rain, *Electric charge, Oceans, Droplets, Ships, Particle counters, Particle size, Spectrometry, Electricity (atmospheric).

Measurements of raindrop electric charge and size and rainfall intensity were made aboard USCGSS Discoverer in the southwest Caribbean Sea from Aug. 10 to Sept. 1, 1968. Raindrop charges were recorded using the raindrop charge spectrometer, which proved adequate for the highly charged convective rainfall experienced. The raindrop collections had relatively low net charge averages, while individual raindrops were highly charged. Size distributions were similar to Pacific Northwest rain, but with a greater number of large raindrops. In addition to being computed fro ozalid paper flux spectra, rainfall rates were determined from water sample amounts and shipboard rain gauges. Although the numbers from the water collections are probably minimums, the three independent means gave comparable results. The relatively low net charge averages of the more intense Caribbean rains are probably due to the increased number of collisions between raindrops and break up of large drops. These occurrences separate large magnitudes of charge of opposite sign in significant atmospheric electric fields. (Author abstract modified)
APTIC-26162

SMALL-SCALE VARIATIONS OF THE CONTAMINATION OF RAIN CAUSED BY WASHOUT FROM THE LOW LAYERS OF THE ATMOSPHERE.

Tellus (Uppsala), 21 (5):685;692, 1969. 8 refs.
Tage Andersson.
Identifiers: *Washout, *Domestic heating, Monthly, Sweden, Urban areas, Air quality measurements, Rain, Calcium compounds, Potassium compounds, Sulfur compounds, Chlorine compounds.

During July-October 1962, a network of 24 stations in an area of about 400 sq km surrounding Uppsala, Sweden, collected monthly rainfall samples for analysis. The area has few industries and, presumably, most of the air pollution originates in home heating systems. Measured concentrations of potassium, calcium, chlorine, and sulfur had a maximum in and close to the town. This is explained by washout in the subcloud layer, which is most polluted in the town. The results obtained agree well with theoretical considerations. (Author abstract modified)
APTIC-26182

FLUORESCENT PARTICLES AND THEIR USE IN STUDYING AIR MOTION.

Meteorol. Mag. (London), 93 (1104):193-201, July 1964. 4 refs.
N. Thompson.
Identifiers: *Diffusion, *Tracers, *Fluorescence, Great britain, Inversion.

Experiments are described in which fluorescent particles of zinc cadmium sulfide were released from an aircraft and used as a tracer to measure vertical diffusion. The fluorescent particles diffused rapidly at lower levels but slowly, or negligibly, in the vicinity of temperature inversions. Recovery of the particles decreased significantly with increasing travel time, and further studies showed that the decrease was due to a loss in fluorescent brightness following exposure to daylight. Tracer decay is unimportant in measuring diffusive spread, where the concern is with relative concentrations of particles through a cross-section of a plume or line. However, estimations of absolute concentrations require that a correction factor as large as 2 be applied to daytime results for travel times of two or three hrs.
APTIC-26190

THE LONG RANGE DIFFUSION OF THE EFFLUENT CLOUD FROM THE PHOEBUS 1B EP-IV REACTOR TEST OF FEBRUARY 23, 1967.

California Univ., Livermore, Lawrence Radiation Lab., 29p., April 1968. 20 refs. NTIS: VCRL-50418
Todd V. Crawford.
Identifiers: *Computer programs, *Diffusion models, *Plume behavior, Reactors (nuclear), Mathematical modeling, Altitude, Winds, Clouds, Micrometeorology, Radioactive radiation.

The Phoebus 1B EP-IV reactor test was conducted at the Nuclear Rocket Development Station, 90 miles northwest of Las Vegas, and the movement and diffusion of the effluent cloud are discussed. This cloud was tracked by aircraft for almost three days, and useful concentration measurements were obtained for almost two days. Pre- and post-run calculations were done with a computer code for large cloud diffusion using climatology and observed meteorology respectively. Comparisons of measured and calculated concentrations and cloud size indicate that calculations yielded concentrations a factor of 2 to 5 higher than observed. The most likely explanation is the presence of a large amount of change with height through the depth of the cloud of the mean wind direction. The increased dilution rate due to this effect is not included in the calculation model. (Author abstract modified)
APTIC-26192

CHEMICAL PROBLEMS IN AIR POLLUTION.

(Taiki osen no kagakuteki shomondai). Text in Japanese. Seisan Kenkyu (J. Inst. Ind. Sci., Tokyo Univ.), 20 (2):4-16, Feb. 1968. 50 refs.
Shin Suzuki, and Shinichi Kikuchi.
Identifiers: *Photochemical reactions, Japan, Oxidants, Dusts, Mists, Measurement methods, Control methods, Temperature (atmospheric), Hydrocarbons, Carbon monoxide, Nitric oxide (no), Nitrous oxide (n20), Sulfur dioxide, Solar radiation.

In the ambient atmosphere there are gases such as sulfur dioxide, nitric oxide, nitrous oxide, carbon monoxide, oxidants, hydrocarbons, and small particulates such as mist and dust. They undergo various atmospheric chemical reactions under the influence of sunlight and temperature, and could become converted to other substances, or create new substance. In view of such phenomena, recent chemical problems such as effects, measurements, and control measures are discussed. The topics include sulfur dioxide, SO2-NO2 (NO)-02 system reactions, SO2-hydrocarbon system reactions, SO2-NO2 (NO)- hydrocarbon reactions, gas-smoke interactions, carbon monoxide, NO2-hydrocarbon and oxidant-hydrocarbon atmospheric reactions, and analysis of oxidants.
APTIC-26198

METEOROLOGICAL ASPECTS OF AIR POLLUTION AND SIMULATION MODELS OF DIFFUSION, TRANSPORT AND REACTIONS OF AIR POLLUTION: TASK FORCE ASSESSMENT.

In: Project Clean Air. California Univ., Los Angeles, Dept. of Meteorology, Task Force 4, 60p., Sept. 1, 1970. 46 refs.
M. Neiburger, J. G. Edinger, and H. C. Chin.
Identifiers: *Diffusion models, *Meteorology, *Photochemical reactions, California, Urban areas, Monitoring, Mathematical modeling, Simulation, Transport.

Based on a review of the state of the art and as indicated by participants at simulation conferences held at the University of California, the solution to the problem of numerical simulation of the transport, diffusion, and reactions of air pollutants requires greatly increased efforts. However, attempts to obtain more realistic models with better predictive characteristics and to apply them to specific urban areas are continuing at an increasing rate. Among the remaining tasks are: the development of methods of integrating a continuity equation for transport and diffusion within an Eulerian frame; development of methods of solving systems equations representing the simultaneous interaction of several reacting species; determination of the sensitivity of the models to various types of data; and testing of models by computing concentrations of specified pollutants whose source inventories are known and comparing the computed values with those observed at monitoring stations. Representative urban diffusion models are summarized in tabular form, and

California pollutant monitoring stations are surveyed.
APTIC-26222

COLLISION RATES BETWEEN GAS MOLECULES AND AEROSOL PARTICLES.

In: Project Clean Air. California Univ., Berkeley, Task Force 7, Vol. 4, App.-A, 7p., Sept. 1, 1970. 16 refs.
C. T. Mottershead.
Identifiers: *Aerosols, *Pollution precursors, *Reaction kinetics, Smog, Visibility, Particle shape, Particle size, Mathematical analyses, Gases.

The fundamental limits on the rate of the possible reactions between pollutant molecules and atmospheric particulates are given by the rate of collision of gas molecules with the aerosol surface. These basic collision rates are estimated for typical smog aerosols. Although real atmospheric particulates may have various shapes, both regular and irregular, most theoretical discussions are based for simplicity on the assumption of spherical particles. Particles of other shapes are often treated in terms of equivalent radii. If the size distribution of the aerosol is known, the specific area may be calculated. On a clear day and often in the early morning hours of what will be a smoggy day, the visual range is 20 kilometers or more. In this case the molecule-particle collision half-time is about 80 seconds. In a severe smog the visibility may be reduced to a kilometer, and this simple rule then states that the half-time for gas molecules to collide with particulates is about 4 seconds.
APTIC-26228

REACTIONS IN THE ATMOSPHERE.

In: Project Clean Air. California Univ., Berkeley, Task Force 7, Vol. 4, Section 3, 25p., Sept. 1, 1970. 14 refs.
Harold Johnston.
Identifiers: *Nitrogen dioxide (no2), *Photolysis, *Reaction kinetics, Nitrous acid, Carbonyls, Chlorine compounds, Ethylene, Aromatic hydrocarbons, Hydrogen, Hydroxides, Carbon monoxide, Nitric oxide (no), Nitrogen trioxide (no3), Oxygen, Ozone, Free radicals.

Nitrogen dioxide is the dominant photochemical reactant in the lower atmosphere. With an excess of nitric oxide over NO2, nitrous acid is photolyzed to yield hydroxyl radicals at about one-twentieth the rate of photolysis of nitrogen dioxide to yield the oxygen atom. In view of the exceedingly high reactivity of the hydroxyl radical, this rate of production is significant. Of all atmospheric reactions consuming oxygen atoms, the addition of oxygen molecules to form ozone is by far predominant. The nitrate-free radical nitrogen trioxide is formed by the reaction of ozone with nitrogen dioxide, and its fastest rate of construction is its reaction with nitric oxide. Hydrogen atoms are produced by the hydroxyl radical plus carbon monoxide reaction, and the fastest rate of destruction is by comination with oxygen. The perhydroxyl radical HOO is produced from addition of H to O2. Aromatic hydrocarbons anc certain carbonyl compounds absorb sunlight, do not decompose, the rather go through excited singlet and triplet states of finite lifetime. Singlet oxygen has been a matter of great interest in recent years. The oxy-radicals of chlorine are also of interest in air pollution. Organic radicals and other products formed by reactions of inorganic intermediates with organic reactants are also discussed. Olefin-ozone reactions are mentioned, as well as the reaction of oxygen atoms with ethylene. The reactions of radicals with oxygen are cited, and free radical arithmetic is discussed.
APTIC-26229

RATE CONSTANTS FOR ATMOSPHERIC REACTIONS.

In: Project Clean Air. California Univ., Berkeley, Task Force 7, Vol. 4, Section 2, 53p., Sept. 1, 1970. 180 refs.
Leo Zafonte.
Identifiers: *Photooxidation, *Reaction kinetics, Hydrocarbons, Olefins, Hydroxides, Nitric oxide (no), Oxygen, Ozone, Free radicals.

Rate constants are provided for ozone-olefin reactions, oxygen atom-olefin reactions, oxygen atom-alkane reactions, hydroxyl radical reactions, and the photooxidation of nitric oxide. The role of singlet oxygen in photochemical reactions is also discussed.
APTIC-26234

THE FORMATION, REACTIONS, AND PROPERTIES OF PEROXYACYL NITRATES (PANS) IN PHOTOCHEMICAL AIR POLLUTION.

In: Advances in Environmental Sciences and Technology. J. N. Pitts, Jr. and R. L. Metcalf (eds.), Vol. 1, New York, Wiley-Intersciences, 1969, p. 119-146. 27 refs.
Edgar R. Stephens.
Identifiers: *Peroxyacetyl nitrate, Plant damage, Smog, Gas chromatography, Saltzman method, Spectrometry, Organic nitrogen compounds, Nitrogen oxides, Oxygen, Hydrolysis, Photolysis, Reaction kinetics, Reaction mechanisms.

The peroxyacyl nitrates are a homologous series of organic nitrogen compounds that are formed when sunlight acts on air which is polluted with trace concentrations of organic compounds and nitrogen oxides. Exposures to concentrations measured in pphm can cause visible damage to agricultural crops; concentrations of 100-200 ppm are lethal for mice in a 2-hr exposure. Kinetics and the mechanism of formation of PAN are discussed. Methods of preparation include the photolysis of mixtures of nitrogen oxides with organic compounds in air or oxygen, the photolysis of alkyl nitrite vapor in oxygen, the dark reaction of aldehyde vapor with nitrogen pentoxide, and the nitration of peracetic acid. The gas chromatograph which is used for the purification of PAN is also discussed; it is made almost entirely of borosilicate glass. The infrared, ultraviolet, mass, and nuclear magnetic resonance spectra are described. In another method, the sample to be analyzed is absorbed in aqueous potassium hydroxide which hydrolyzes PAN to form nitrite ion; the nitrite ion is then determined colorimetrically using Saltzman's reagent. Results of analyses are indicated. The stability and hydrolysis of PAN reactions are discussed.
APTIC-26235

EFFECT OF DILUTING STACK GASES ON DOWNWIND CONCENTRATION.

Nucl. Safety, 8 (2):161-164, Winter 1966-1967. 9 refs.
Pamela M. Bryant.
Identifiers: *Plume behavior, *Stacks, Great britain, Stack gases, Mathematical analyses, Winds, Temperature (atmospheric), Stability (atmospheric).

Examples are given to illustrate the effect on downwind concentrations of diluting stack gas before discharge. Dilution (by a factor of 3) would reduce downwind concentrations of a cold plume to about one-third or less for 10-, 20-, and 50-m stacks and to between one- and two-thirds for 100- and 200-m stacks. The reduction would be achieved in clear and sunny weather or with partial or complete cloud cover. Dilution of a hot plume by air at ambient temperature (288 K) would achieve a reduction of one-third or less for 10- and 20-m stacks and a reduction between one-third and two-thirds for 50- and 100-m stacks but only under conditions of partial or complete cloud cover. Dilution of a hot plume by air at the temperature of waste gas (338 K) would obtain a reduction of one-third or less for 10-, 20-, and 50-m stacks under conditions of partial or complete cloud cover and a reduction between one- and two-thirds for all other weather conditions. The reductions noted apply when the efflux velocity is about 10 m/sec before dilution and 30 m/sec after dilution.
APTIC-26261

AIR POLLUTION POTENTIAL OVER THE SALT LAKE VALLEY OF UTAH AS RELATED TO STABILITY AND WIND SPEED.

J. Appl. Meteorol., vol. 3:92-97, Feb. 1964. 9 refs.
Philip Williams Jr.
Identifiers: *Air pollution forecasting, *Smoke shade, *Salt lake valley, Diurnal, Seasonal, Utah, Valleys, Smokes, Visibility, Winds, Precipitation, Weather forecasting, Stability (atmospheric).

Stagnant high-pressure systems are frequently found over the Salt Lake valley during fall and late winter. They can remain in the region for as long as three or four weeks during which time smoke is trapped in the valley and visibility reduced. In the absence of long-term measurements of particulate matter in the Salt Lake valley, a Smoke Index (SI) was developed as an indicator of air pollution in the valley, the SI defined so as to express numerically the total visibility reduction due to smoke during a 24-hr period. Values of this index are well correlated with the previous day's SI and the current day's stability and average hourly wind speed. Significant amounts of precipitation produce a marked day to day lowering of the SI. Use of the above relationships to forecast the SI would depend on forecasts of wind speed and stability. National Meteorological Center prognostic charts can be of value in forecasting the average hourly wind speed, but methods would have to be devised to forecast day to day changes in stability. (Author conclusions modified)
APTIC-26264

THE DIFFUSION OF SMOKE GASES FROM FACTORY CHIMNEYS AND ITS METEOROLOGICAL CONDITIONS.

Stud. Geophys. Geod., vol. 8:82-96, 1964. 31 refs.
Milan Hasek.
Identifiers: *Plume behavior, *Meteorology, Hourly, Czechoslovakia, Stack gases, Smokes, Electric power production, Stacks, Ground level, Diffusion models, Turbulence (atmospheric), Sulfur dioxide.

A knowledge of the turbulent energy balance in different parts of the spectrum is required for a study of the diffusion of a smoke plume. The smoke entering the atmosphere is acted on not only by the dynamically conditioned effects of turbulent mixing (mechanical mixing) but also by turbulence which causes mainly the removal of eddies in the vertical direction (thermic turbulence). Time changes in concentration on the basis of changes in the turbulent spectrum are discussed and methods of determining turbulent parameters (the dimensionless meteorological exponent and the virtual coefficients of diffusion) are analyzed. A formula is derived for calculating maximum surface concentration which can be applied for hourly intervals during constant flow in a selected 10-min interval for the average 10-sec directions of flow. Field measurements of sulfur dioxide in the neighborhood of a power plant and theoretical computations yielded satisfactory agreement.
APTIC-26267

FORECASTING COH LEVELS AT SIX OUTLYING SAMPLING STATIONS IN ALLEGHENY COUNTY USING STATISTICAL CORRELATIONS DERIVED FROM THE DOWNTOWN STATION.

J. Air Pollution Control Assoc., 29 (12):825-827, Dec. 1970. 1 ref.
David G. McFarland, Joseph W. DeNardo, and Walter G. Popiel.
Identifiers: *Air pollution forecasting, *Hydrocarbons, Diurnal, Pennsylvania, Urban areas, Statistical analyses, Ground level, Winds, Temperature (atmospheric), Inversion.

A system for forecasting COH levels at the downtown sampling station of the Allegheny County Bureau of Air Pollution Control uses wind surface speed and the strength (in degrees centigrade) of the ground inversion as the primary meteorological predictors. As determined by a frequency comparison of four COH levels at the

downtown station with each of six surrounding stations in three daily time periods, the downtown station can be used as a 'control station' in forecasting low or moderate COH levels for the other stations. However, the occurrence of high or very high COH levels at the outlying stations do not occur with a high enough statistical consistency to be predicted by using the forecast value of the downtown station.
APTIC-26280

THE ROLE OF THE WINDS WITH SOUTHERN COMPONENT IN THE AIR POLLUTION.

(A deli osszetevoju szelek szerepe a
legszennyezodesben). Text in Hungarian. Energia
Atmotech. (Budapest), 23 (9):412-413, 1970.
Laszlo Aujeszky.
Identifiers: *Abatement, *Planning and zoning, *Winds, Europe, Urban areas, Topographic interactions, Turbulence (atmospheric).

In meteorological observations made in Budapest and some other Hungarian municipalities, winds from the southwest, south, and west favor a condition of high air pollution. This is not so much a topographical phenomenon as it is the absence of turbulence in the southerly winds. It is thus imperative to avoid constructing plants that would be a source of pollution to the south of populated areas in that area, or at any rate they should make use of devices to reduce the concentration of pollutants.
APTIC-26294

6. BASIC SCIENCE AND TECHNOLOGY

INCORPORATION OF ACETATE-1-C14 INTO ALKANES, FATTY ACIDS, METHYL ESTERS AND FREE FATTY ACIDS OF SPORES AND MYCELIUM OF RHIZOPUS ARRHIZUS.

Preprint, Houston Univ., Tex., Dept. of Biology,
19p., 1969 (*). 19 refs.
J. D. Weete, and D. J. Weber.
Identifiers: *Lipids, *Fungi, Spores, Organic acids, Esters, Aliphatic hydrocarbons, Benzenes.

Spores are the major means of dispersion and survival of fungi. Lipid materials have been suggested as an important factor in the ability of spores to withstand adverse environmental conditions. The lipid components were extracted from mycelium and spores of Rhizopus arrhizus Fischer and divided into three fractions. The n-heptane fraction contained low concentrations of hydrocarbons in the mycelium. The spore extract contained little or no hydrocarbons. The benzene fraction contained mainly methyl esters of fatty acids in both the spores and the mycelium. The methanol fraction contained free fatty acids in the spores and mycelium. Acetate-1-C14 was incorporated into the methyl esters of fatty acids and the free fatty acids of both the spores and the mycelium. Very little radioactivity was detected in the n-heptane fraction (hydrocarbonss). (Author abstract modified)
APTIC-12614

LIPID COMPONENTS OF SCLEROTIA OF SCLEROTINIA SCLEROTIORUM.

Preprint, Houston Univ., Tex., Dept. of Biology
and Idaho Univ., Moscow, Dept. of Agriculatural
Biochemistry and Soils, 13p., 1969 (*). 12 refs.
John Weete, D. J. Letourneau, and D. J. Weber.
Identifiers: *Lipids, *Fungi, Organic acids, Alcohols, Aliphatic hydrocarbons, Benzenes.

Sclerotia are dormant masses of compact mycelium that are resistant to unfavorable conditions, but can germinate in a favorable environment. Little is known about their chemical composition, especially the lipid components. The lipid components of sclerotia of Sclerotinia sclerotiorum from the natural habitate and from defined media were analyzed. The n-heptane fraction contained hydrocarbons in the field samples, but little or no hydrocarbons in the fraction from the sclerotia grown on defined medium. The benzene fraction contained few compounds in any of the preparations with exception of a field sample. All of the samples contained fatty acids in the methanol fraction and the concentration of individual fatty acids varied with the substrate. (Author abstract modified)
APTIC-12615

FATTY ACID ANALYSIS OF CEREBROSPINAL FLUID OF CHICKEN.

Preprint, Houston Univ., Tex., Dept. of Biology,
7p., 1969 (*). 3 refs.
J. D. Weete, R. L. Hazelwood, and D. J. Weber.
Identifiers: *Fatty acids, *Gas chromatography, *Poultry, Nervous system, Organic acids.

The cerebrospinal fluid is difficult to obtain in concentrations high enough to do analytical analysis. As a result, few chemical analyses have been made. In the case of the chicken, a method has recently been developed for obtaining small quantities of the cerebrospinal fluid. Sufficient material was obtained to do a fatty acid analysis with gas chromatography. The total and free fatty acids from chicken plasma and cerebrospinal fluid were determined. The free and total fatty acids were similar in the cerebrospinal fluid. The predominate fatty acids in the cerebrospinal fluid were C16, C18:1, and C18. (Author abstract modified)
APTIC-12616

PRELIMINARY INVESTIGATIONS ON THE BIOSYNTHESIS OF METHYL ESTERS OF FATTY ACIDS IN RHIZOPUS ARRHIZUS FISCHER.

Preprint, Houston Univ., Tex., Dept. of Biology,
10p., 1969 (*). 8 refs.
John D. Weete, and Darrell J. Weber.
Identifiers: *Fatty acids, *Cells, *Esters, Spores, Organic acids, Reaction mechanisms.

The presence and preliminary cell free synthesis of natural methyl esters of fatty acids in Rhizopus arrhizus is reported. In both the crude preparation and partially fractionated soluble enzyme extracts of Rhizopus arrhizus, the cell-free synthesis of methyl esters of palmitic-1-C14 acid is demonstrated. The fact that methionine, ATP and magnesium ions appear to stimulate this synthesis suggests that in vivo mechanism of synthesis of the natural methyl esters is one common to many known transmethylation reactions. Methionine, in the presence of ATP and Mg ions, enzymatically, forms the s-adenosyl-methionine complex. This high energy metabolite is capable of donating the alpha-methyl group of methionine to a specific acceptor. This reaction is catalyzed by a specific methylase enzyme. Conditions for a reproducible, efficient cell-free synthesizing system have not yet been found. By utilizing the preliminary information thus far obtained, further investigation will prove fruitful in defining this system and characterization of the enzyme (s) responsible for this reaction (s). (Author summary modified)
APTIC-12755

DISCUSSION OF 'A STATISTICAL APPROACH TO DESCRIBING VEHICULAR DRIVING CYCLES'. F. BECKLEY SMITH, JR., W. A. P. MEYER, AND R. U. AYRES, SAE PAPER NO. 690212.

Preprint, National Air Pollution Control
Administration, Washington, D. C., Div. of Motor
Vehicle Pollution Control, 5p., 1968 (*). 2 refs.
(Presented at the International Automotive
Engineering Congress, Detroit, Mich., Jan. 16,
1969.)
Thomas A. Huls.
Identifiers: *Engine operating cycles, *Automobiles, *Statistical analyses, Engine exhausts, Experimental equipment, Experimental methods, Research methodologies.

A discussion of a paper by Smith, Meyer, and Ayres on 'A Statistical Approach to Describing Vehicular Driving Cycles' (SAE Paper No. 690212) is presented. In the paper, the driving cycle is represented in terms of a joint density function of three variables: vehicle acceleration, vehicle speed, and road gradient. The slope-indicating instrument described in the paper is criticized, and possible errors are pointed out in its application. The data points which the paper presents are questioned, and the method by which they were obtained is discussed. The effects of vehicle acceleration and pitch on the various values presented by the paper are explained, and some data are recalculated on the basis of corrected assumpitons.
APTIC-12771

MASS AND MOMENTUM EQUATIONS OF ISOTHERMAL NON-ISOBARIC GAS-LIQUID PHASE REACTIONS. III.

(Massen-und Impulsbilanzgleichungen isothermer
nichtisobarer Gas-Flussigphase-Reaktoren. III).
Brennstoff-Chem. (Essen), 50 (1):21-25, Jan. 1969.
4 refs. Translated from German. Franklin Inst.
Research Labs., Philadelphia, Pa., Science Info.
Services, 21p., July 18, 1969.
Horst Langemann.
Identifiers: *Reactors (nuclear), *Mathematical analyses, *Thermodynamics, Germany, Gases, Liquids, Pressure, Temperature.

A solution of the mass and momentum equations for isothermal nonisobaric gas-liquid phase reactors is presented. The relationships derived, can to a large extent, be applied to three-phase reactors. The five momentum equations established with the one dimensional model of a vertical, stationary, isothermal gas-liquid-phase-countercurrent reactor are based on the assumption that the reactor cross section, the mass density of the liquid phase and the mean mol mass of the gaseous phase remain constant. The five equations are: the momentum equation of a reactor element, the continuity equations of the gaseous and liquid phases, the relationship between the relative volumetric fractions of the gaseous and liquid phases and the equation of state of ideal gases. They are used to solve for six unknown factors, namely static pressure, the mean flow velocities of the gaseous phase and of the liquid phase, the relative volumetric fractions of the gaseous phase and of the liquid phase, and the mass density of the gaseous phase. By combination of the equations, the equation system can be changed into one of two differential equations with two unknown functions, the static pressure and the relative volumetric fraction of the gaseous phase. To solve the differential equations, the characteristic of one of the six functions must be found experimentally or by basing it on certain assumptions. For the solution presented it makes sense to assume that the relative volumetric fractions of the phases and the flow velocity of the gaseous phase remain constant.
APTIC-12835

ON THE ROENTGENOLOGICAL DETECTABILITY OF DUST DEPOSITS IN THE LUNGS. STUDIES ON THE ALDERSON-RANDO PHANTOM.

(Zur Frage der roentgenologischen Darstellbarkeit
von Staubdepots in den Lungen. Untersuchungen
am Alderson-Rando-Phantom.) Text in German.
Beitr. Silikose-Forsch., 97:1-21, 1968. 14 refs.
T. Goebbeler, W. Klosterkoetter, E. Loehr, L.
Magnus, and E. Scherer.
Identifiers: *Radiography, *Silicosis, *Dusts, Lungs, Diseases and disorders, Respiratory diseases, Pneumoconiosis, Germany, Pollutants, Particulates, Sources, Industrial emission sources, Mineral processing, Mining, Photometric methods, X-rays.

Experiments were conducted to determine detectability in the lungs of mine dusts by means of X-rays. An Alderson-Rando phantom, which very

faithfully simulates human body structure and X-ray absorption capacities, was used to simulate the human body. Mine dusts with varying ash and pyrite contents, and with particle sizes less than 60 milimicrons, were deposited in varying thicknesses on paraffin plates. These were placed in various segments of the phantom. Dusts with ash contents of 26% are detectable in the lung phantom, down to a minimum of 3.3 mg. This ash content represents the lower critical range of normal mine dusts. Photometric measurements show an almost linear relation between dust content and photometric density. It is concluded that mine dust embedded in the silicotic lung contributes to the formation of shadow spots in X-ray photographs.
APTIC-18289

TABLES OF DRIFT VELOCITIES OF SLOW ELECTRONS IN HELIUM, NEON, ARGON, KRYPTON, XENON, HYDROGEN, DEUTERIUM, NITROGEN, CARBON MONOXIDE, CARBON DIOXIDE, WATER VAPOR, NITROUS OXIDE, AND AMMONIA.

Westinghouse Research Labs., Pittsburgh, Pa.,
Dept. of Physics, ONR Contract NONR 2584 (00),
ARPA Order 125-61 (Amd. 4), Proj. 7200, TR-13
WRL RR-62-928-113-R1, 21p., July 23, 1962. 2
refs. CFSTI, DDC: AD 703627
J. L. Pack, R. E. Voshall, and A. V. Phelps.
Identifiers: *Gases, *Drift velocities, *Slow electrons, Ammonia, Hydrogen, Nitrogen, Carbon dioxide, Carbon monoxide, Nitrous oxide (n2o), Water, Vapors, Electric charge, Temperature.

The drift velocities of electrons in various gases are presented in tabulated form. The drift velocities were measured in helium, neon, argon, krypton, xenon, hydrogen, deuterium, nitrogen, carbon monoxide, carbon dioxide, water vapor, nitrous oxide, and ammonia for E/p values from 10 to the minus 4th power to 30 volts/ cm-mm Hg at several gas temperatures between 77 K and 443 K. In all gases except neon measurements were extended to low enough E/p such that the electrons were in thermal equilibrium with the gas. A discussion of the experimental procedure is included. (Author abstract modified)
APTIC-22681

OZONE SYNTHESIS FOR WATER TREATMENT BY HIGH ENERGY RADIATION.

Preprint, American Institute of Chemical
Engineers, New York, N. Y., 32p., 1969. 30 refs.
(Presented at the American Institute of Chemical
Engineers Annual Meeting, 62nd, Washington, D.
C., Nov. 16-20, 1969.) CFSTI: BNL-13812
Meyer Steinberg, and Morris Beller.
Identifiers: *Sewage treatment, *Ozone, *Radioactive radiation, Reactors (nuclear).

Ozone can be used effectively in reducing chemical oxygen demand in tertiary treatment of secondary sewage waste effluent. provided an economical production process is available. Commercial quantities cannot be produced photochemically. Results of radiation chemistry studies with a chemonuclear loop that utilizes either reactor neutron and gamma energy or fission fragment energy of uranium-containing alloy foils indicate that G-values for ozone production from oxygen in a high-pressure production facility can range between 10 and 15. These energy values are at least two to three times higher than those obtained by the electric discharge process. Use of isotopic radiation such as the long-lived waste fission product Cs137 can be considered only for treating drinking water or sewage in quantities less than 10 Mgd. The fission fragment chemonuclear process has a large potential for producing hundreds of tons of ozone per day and treating sewage waste effluent in the hundred of Mgd to over a billion gallons per day sizes. At these rates, the cost of ozone production should be at least half that of the electric discharge process. This substantial saving should prompt development of the chemonuclear process for large-volume users of ozone. (Author abstract modified)
APTIC-24041

PRIMARY PHOTOCHEMICAL PROCESSES IN THE 3660 A PHOTOLYSIS OF 5',7'-DICHLORO-6'-NITRO-1,3,3-TRIMETHYL-INDOLINO-BENZOPYRYLOSPIRAN (I) IN ACETONITRILE.

Preprint, American Chemical Society,
Washington, D. C., 31p., 1968. 52 refs. (Presented
at the American Chemical Society, 155th National
Meeting, San Francisco, Calif., April 1968.)
Helmut Bach, and Jack G. Calvert.
Identifiers: *5'-7'-dichloro-6'-nitro-1-3-3-trimethyl-indolino-benzopyrylospiran (i), *Photolysis, Quenching, Spectrometry, Polynuclear compounds, Organic nitrogen compounds, Phosphorescence, Photoelectric phenomena, Reaction kinetics, Thermodynamics.

The structural changes effected on irradiation of 5',7'-dichloro-6'-nitro-1,3,3-trimethyl-indolino-benzopyrylospiran (I) are discussed. Quantum yields of the formation of the colored form (II) of the spiropyran (I) are determined for the direct and the sensitized photolysis in acetonitrile solutions at 3660 A and 24 deg (room temperature). The compounds, benzophenone and 2 - acetonaphthone, sensitize the formation of II. Benzil has little effect either as a sensitizer or as a quencher, while 9-flurrenone quenches rather effectively a fraction of the color formation in the direct photolysis of I. From a kinetic analysis of the initial rates of formation of II in the sensitized and quenched reactions, quantitative estimates are made of the quantum yields of the primary reactions involved in the direct photolysis of I. The data suggest that in the direct photolysis at 3660 A, both singlet and triplet excited states of I react to form II. Triplet-energy transfer experiments indicate that the energy of the triplet state of I lies above the ground state by 53-57 kcal/mole; this estimate is reasonably consistent with the observed position of the O-O band (58 kcal/mole) in the phosphorescence spectrum if I. (Author abstract modified)
APTIC-24042

ADDITION OF DINITROGEN TRIOXIDE TO NONCONJUGATED DIENES.

J. Org. Chem., 35 (8):2785-2790, 1970. 10 refs.
M. L. Scheinbaum.
Identifiers: *Dienes, *Nitrous anhydride (n2o3), *Chemical reactions, Olefins, Nitrogen oxides, Chemical bonds, Free radicals, Reaction mechanisms.

The addition of dinitrogen trioxide proceeds selectively at the bicyclic double bond of dicyclopentadiene. Simple adduct formation without transannular reaction occurs with 1,5-cyclooctadiene; however, norbornadiene undergoes transannular addition to give nortricyclene derivatives. Reduction of the adducts lead to hydroxylamino oxime derivatives and diamines. The course of addition of nitrogen oxides is interpreted by a free-radical pathway. (Author abstract)
APTIC-24165

METER FOR DETERMINING MASS FLOW OF SOLIDS IN MULTI-PHASE FLUIDS.

American Society of Mechanical Engineers, New
York, Proc. Symp. Multi-Phase Flow,
Philadelphia, Pa., 1963, p. 49-54. 4 refs. (Nov. 17-22.)
H. G. Gibson, W. T. Abel, and G. E. Fasching.
Identifiers: *Flowmeters, *Solids, Heat transfer, Gases, Liquids, Flow rates.

A study of gas-solid suspensions as a means of increasing the heat-transfer coefficients of heat exchangers and the volumetric heat capacity of gas coolants for nuclear reactors necessitated the development of a flowmeter that would detect the flow of solids through a heat-exchanger loop and measure mass flow with reasonable accuracy. A device incorporating the cantilevered-beam force deflection principle was able to differentiate between various concentrations (0.29-0.86 lb/cu ft) of graphite in nitrogen. For a given gas flow, the target was deflected in proportion to the amount of graphite flowing in suspension. Except at the low end of the flow range tested, the response of the meter to both graphite-nitrogen suspensions or pure gas is linear with respect to gas flows. If the gas flows are subject to change, a conventional volume-type flowmeter would be required to provide reference to the proper calibration curve for the mass flowmeter. The mass flowmeter could also be used to meter clean gas and might prove useful for determining the average velocity of solid particles.
APTIC-24590

PRESSURE DIFFERENTIAL SWITCHES OR REGULATORS FOR THE OPENING AND CLOSING OF ELECTRICAL CONTACTS.

(Differenzdruck-Schalter bzw.-Regler zum
Oeffnen und Schliessen elektrischer Kontakte).
Text in German. (Theodor Stiebel, Holzminden,
West Germany) West Ger. Pat. 1,051,359. 4p.,
Feb. 26, 1959. (Appl. Oct. 11, 1956, 4 claims).
Otto Irslinger.
Identifiers: *Switches, *Electrical contacts, *Design criteria, Germany.

A pressure differential switch operating without a stuffing box is described which by means of 2 membranes maintains an equilibrium between forces resulting from pre-set differential pressures. A system of parallel stretched membranes firmly held on their perimeter with a distance spacer in between is divided by a pressure housing operated by a built-in electrical switch into 2 chambers exposed to different stresses. The enclosed space is filled with oil. The contacts for lead-in wires are made of metal insulated by a ceramic mass and are tightly attached to the housing wall of the electric switch consisting of molded plastic. The incompressible oil filling the space between the membranes balances the different pressures to which the membranes are exposed from the outside and thus prevents their bulging out or even their rupture. The placing of the switch in oil provides for better insulation than if it was exposed to air, especially to humid air, and extinguishes electric arcs springing up between the contacts, thus minimizing damage from burning.
APTIC-24595

PRODUCTION OF CARBON DISULFIDE FROM METHANE AND SULFUR DIOXIDE.

(Produzione di solfuro di carbonio da metano e
anidride solforosa). Text in Italian. Chim. Ind.
(Milan), vol. 41:277-280, April 1959. 15 refs.
(Presented at the 8th Congresso Nazionale di
Chimica of the Society of Chemical Industry,
Torino, Italy, May 27-June 2, 1958.)
M. Baccaredda, M. Del Guerra, and G. F.
Nencetti.
Identifiers: *Methanes, *Sulfur dioxide, *Carbon disulfide, *Chemical reactions, Italy, Catalysts, Thermodynamics, Temperature.

Production of carbon disulfide can be obtained by six methods. The authors prepared it by reacting methane and sulfur dioxide as follows: 4 SO2 + 3CH4 yields 2 CS2 + 6H20 + CO2. This reaction can take place in a large field of temperatures, as it can be detected from the expression of the variation of free energy. The reaction is moderately exothermic (21500 calories per mole of CS2 in the field in which it can be realized). A review of all the catalytic agents is presented. Production of CS2 varies with the catalytic agents and the temperature of reaction. Best results have been achieved with kaolin. The reaction was carried out in a porcelain tube 23 mm in diameter, heated by a tubular oven. Products of reaction, after cooling and washing with water, were passed through a refrigerant (dry ice), reaching temperatures of - 70 deg. Carbon disulfide was obtained through condensation. Other products found were sulfur dioxide and very small quantities of hydrogen sulfide.
APTIC-24596

OXIDATION OF SULFUR DIOXIDE ON A VANADIUM CATALYST.

J. Appl. Chem. USSR (English translation from Russian of: Zh. Prikl. Khim.), 43 (2):424-427, Feb. 1970. 11 refs.
V. M. Pomerantsev.
Identifiers: *Sulfur dioxide, *Catalytic oxidation, Ussr, Vanadium compounds, Catalysts, Reaction kinetics, Reaction mechanisms.

Based on an analysis of experimental data, the true mechanism of the oxidation of sulfur dioxide on a vanadium catalyst is SO2 + (O) in equilibrium with SO2 + (), where () is a vacant site on the catalyst surface. An equation for the overall reaction rate, derived from this scheme, is used to calculate rate constants for the experimental data and is close to the true kinetic equation for the reaction. The calculations indicate that the apparent activation energy of the reaction is constant and that there is no break in the Arrhenius plot over a wide range of temperatures and compositions of the gaseous mixtures.
APTIC-24623

ON THE INTERACTION OF AEROSOL PARTICLES WITH ACOUSTIC WAVE IN THE PRESENCE OF HIGH FREQUENCY ELECTRIC FIELD.

(O vzaimodeystvii aerozol'nykh chastits so zvukovoy bolnoy pri nalichii vysokochastotnogo elektricheskogo polya). Text in Russian. Kolloidn. Zh., 32 (4):628-629, 1970.
E. M. Epshtein.
Identifiers: *Acoustic waves, *Aerosols, *Electric charge, Ussr, Mathematical analyses, Light scattering.

The effect of a uniform alternating electric field on the interaction of charged aerosol particles with an acoustic wave the frequency of which is much less than that of the field is considered. This effect produces re-normalization of the interaction constant with the result that its dependence of the field amplitude becomes oscillatory; so does the field dependence of the flux of particles entrained by the acoustic wave of the sound adsorption (scattering) coefficient of these particles. The oscillation period measures can give information on the mobility and mass of aerosol particles. (Author abstract)
APTIC-24624

VENTILATION OF POLLUTED AIR IN ROOMS. VIII. STUDIES ON THEORETICAL EQUATIONS FOR VENTILATION OF POLLUTED AIR DIFFUSED HETEROGENEOUSLY IN ROOM.

(Shitsunai osen kuki no kanki nitsuite (dai 8 po) Fukinitsuna shitsunai osen kuki no nikansuru rironshiki no kosatsu sono 7 (hoi)). Text in Japanese. Eisei Kagaku. (J. Hyg. Chem.), vol. 16:272-280, Oct. 31, 1970. 5 refs.
Koku Matsumoto, Masatoshi Inoue, Tadashi Fujita, and Yuzuru Kitamura.
Identifiers: *Mathematical analyses, *Carbon dioxide, *Ventilation, Japan, Buildings, Diffusion.

An equation is derived that describes the ventilation of air polluted by carbon dioxide heterogeneously diffused in a room. Assuming that the concentration of carbon dioxide depends on time and space, the following equation was obtained on one and two dimensional spaces in a room: a equals exp (log (c (t)/c (o)/t) where a is a ventilation constant, and c (t) and c (o) are the concentration of carbon dioxide at t and t equals o, respectively. When ventilation was carried out with evolution of CO2, the following equation was obtained: log a equals log (c (t + 10)-c (t)/ (c (t) - c (t-10)))/10.
APTIC-24647

THE ROLE OF THE SAMPLE HOLDER IN THE THERMAL INVESTIGATION OF PROCESSES ACCOMPANIED BY THE SPLITTING OFF OF CO.

(Ueber die Rolle des Probebehaelters bei der thermischen Untersuchung von mit CO-Abspaltung einhergehenden Prozessen). Text in German. Acta Chim. Acad. Sci. Hung., 65 (1):35-39, 1970. 8 refs.
I. Porubszky, M. Berenyi, and G. Liptay.
Identifiers: *Platinum, *Catalytic oxidation, *Carbon monoxide, Quartz, Europe, Ammonia, Catalysis, Reaction mechanisms, Surface properties, Temperature.

Most thermoanalytical tests are performed with platinum containers because of their excellent thermal conductivity and chemical resistance. An examination of the effects of platinum container walls on the oxidation of carbon monoxide generated by the thermal decomposition of calcium acetate monohydrate disclose that beginning with a temperature of 200 C, platinum exerted a markedly catalytic effect by accelerating the combustion of CO (and similarly of ammonia) which did not occur with crucibles made of corundum. A comparison of derivatograms confirmed the catalytic effect of platinum.
APTIC-24653

STABILIZATION OF TURBULENT DIFFUSION FLAMES.

(Stabilisierung turbulenter Diffusionsflammen). Chem. Ing. Tech., vol. 42:105-108, 1970. 10 refs. Translated from German. Belov and Associates, Denver, Colo., 10p., Oct. 27, 1970.
R. Guenther.
Identifiers: *Combustion, *Mathematical analyses, *Stabilization, Germany, Diffusion, Flow rates, Gases.

The conditions under which stabilization of flames takes place have not yet been sufficiently defined. Concentration distribution, flame velocity, and flow velocity must interact in a certain manner to make possible a steady burning of flames. Differences between the stabilization process of diffusion flames and pre-mixed flames are described with the aid of geometry. Special attention is given to the energy conditions required for ignition of diffusion flames and to the influence of turbulence on the stabilization of these flames.
APTIC-24698

OZONE ABSORPTION COEFFICIENTS IN THE VISIBLE AND ULTRAVIOLET REGIONS.

Advan. Chem. Ser., vol. 21:263-268, March 1959. 4 refs.
Edward C. Y. Inn, and Yoshio Tanaka.
Identifiers: *Ozone, *Photographic methods, *Spectrophotometry, Absorption, Statistical analyses.

A uniform and consistent set of ozone absorption coefficients is highly desirable because these data are important in atmospheric problems and ozone technology. Previously published results on absorption coefficients of ozone in the visible and ultraviolet regions are compared with a similar set of results obtained by Vigroux. The satisfactory agreement between the ozone coefficients in the regions from 2000 to 3500 A and from 4000 to 7500 A considerabley strengthens the establishment of a consistent set of data. This agreement was obtained despite the distinct differences in the experimental methods and thereby supports the validity and accuracy of the reported data. (Author conclusions modified)
APTIC-24701

THERMODYNAMIC ANALYSIS OF THE REDUCTION OF SULFUR DIOXIDE BY METAL SULFIDES WITH THE FORMATION OF ELEMENTAL SULFUR.

(Termodinamicheskiy analiz vosstanovleniya sernistogo angidrida sul'fidami metallov s obrazovaniyem elementarnoy sery). Text in Russian. Tr. Ural. Nauch.-Issled. Proekt. Inst. Mednoi Prom., no. 10:287-293, 1967. 7 refs.
L. A. Kulikova, A. I. Okunev, and V. Ya. Koshkarov.
Identifiers: *Metal compounds, *Sulfides, *Reduction, *Thermodynamics, *By-product recovery, *Alkaline additives, Ussr, Combustion gases, Mathematical analyses, Oxygen, Sulfur compounds, Sulfates, Pressure, Temperature.

Results from analysis of the reduction of sulfur dioxide (SO2) by sulfides of alkali and alkaline earth metals and magnesium at 500-1100 C are presented and show that 95-100% reduction is achieved without the formation of any gaseous by-products at temperatures of 500-800 C. During the reduction of SO2, and also during reaction with oxygen, the sulfides convert to sulfates which may be regenerated with a reducing gas. Analysis is made on the basis of the entropy equation. Product yields were determined from stoichiometric ratios of reagents for a pressure of 1 atm.
APTIC-24703

SIMULTANEOUS RECOVERY OF LOW-CONCENTRATION SULFUR OXIDES AND NITROGEN OXIDES WITH ALKALIES AND CARBONATES. IV. ABSORPTION WITH MAGNESIUM HYDROXIDE.

(Sovmestnoye ulavlivaniye nizkokontsentrirovannykh sernistykh i nitroznykh gazov shchelochami i karbonatami. IV. Pogloshcheniye gidrookis'yu magniya). Text in Russian. Izv. Akad. Nauk Arm. SSR, Khim. Nauk, 13 (2-3):101-106, 1960. 3 refs.
M. G. Manvelyan, G. O. Grigoryan, S. A. Gazaryan, G. S. Papyan, and N. M. Grigoryan.
Identifiers: *Hydroxides, *Magnesium compounds, *Absorption (general), Ussr, Stack gases, Nitrogen oxides, Sulfur oxides, Temperature.

Studies of the absorption of nitrogen oxides at concentrations up to 0.045% and sulfur oxides at 0.6 to 2.2% by magnesium hydroxide are reported. It was found that oxidation of magnesium sulfite by atmospheric oxygen is optimum at 40-50 C, each nitrogen oxide molecule initiating the oxidation of 150-200 SO3 ions. The magnesium sulfate thus formed had no significant effect on the subsequent process of sulfite oxidation. Production of concentrated magnesium sulfate solutions (20-23%, anhydrous) by this method is possible.
APTIC-24704

GAS DYNAMICS OF ACCELERATING PARTICULATE FLOW IN CIRCULAR DUCTS.

Preprint, p. 148-166, 1965 (*). 12 refs. CFSTI,DDC: 700450
G. J. Trezek, and S. L. Soo.
Identifiers: *Suspended particulates, *Flow rates, Combustion products, Missiles and rockets, Mathematical modeling, Pressure (atmospheric), Oxides.

With the aim to develop an understanding of high velocity flow of a suspension through conduits and the effect of wall friction, a study of accelerating particulate flow (Fanno flow) using a blowdown system was made. Modern solid fuel rockets have about 30-40% of condensed metal oxide in their combustion products, and these solids only act as a detriment in the nozzle expansion process. A blowdown technique for the study of accelerating particulate flow was employed since it affords the opportunity to inject particles at atmospheric pressure and also provides a convenient reference pressure by the fact that the ambient atmospheric pressure remains constant for relatively long periods of time during test running conditions. From measurements of the pressure along the duct axis, gas phase and particle phase velocities and the friction coefficient are obtained with a numerical evaluation of the one dimensional gas dynamic model. As the loading ratio increases, the velocities of the phases decrease. While the particle velocity is very nearly that of the gas velocity at inlet, at the duct exit the particles may lag the fluid by as much as 500 ft/sec. As the particulate flow accelerates down the duct, the particle lag becomes appreciable where the compressibility of

the gas phase starts to become significant. The effects of fluid compressibility on the particle lag and the increase of friction coefficient as a function of the loading ratio are illustrated. The error incurred by not basing the Mach number for a particulate flow on the speed of sound of the mixture was noted. (Author abstract modified)
APTIC-24726

HYDROGEN SULFIDE FROM SULFUR DIOXIDE AND METHANE.

Ind. Eng. Chem., vol. 38:906-912, 1946. 24 refs.
Scott W. Walker.
Identifiers: *Methanes, *Sulfur dioxide, *Hydrogen sulfide, *Chemical reactions, Decomposition, Flow rates, Reaction kinetics, Reaction mechanisms, Temperature.

Equilibrium calculations from existing data give a clear picture of the effect of certain variables on the reaction of sulfur dioxide and methane. The ratio of reactants, N (SO2)/CH4), is an important factor in the yield of hydrogen sulfide and other reaction products. Experimental confirmation of the conditions predicted by these calculations is reasonably satisfactory. The rate of the over-all reaction within the range 850-1000 C appears to be controlled by the rate of reaction or decomposition of methane; the effect of temperature on over-all rate is appreciable, the yield of hydrogen sulfide increasing with temperature. The effect of space velocity within the range for flow rates of 660-1320, temperature 850-1000 C, and N equal to 0.5 appears to be negligible. Sulfur formation is encountered either at high values of N, high rates of flow, or low temperature. At N equals 0.5, temperature range of 850-1000 C, and flow rates of 660-1320, high yields of hydrogen sulfide can be produced by the reaction of sulfur dioxide and methane. At 1000 C and flow rates of 880, the value of N can be varied from 0.5 to 1.0 without affecting hydrogen sulfide yield. (Author abstract modified)
APTIC-24739

DEVELOPMENT OF MOLECULAR CONDENSATION NUCLEI AND CONDITIONS FOR ITS OBSERVATION.

Doklady Phys. Chem. Sect. (English translation
from Russian of: Doklady Akad. Nauk SSSR), 179
(4-6):263-266, April 1968. 11 refs.
Ya. I. Kogan, L. E. Donetskaya, L. N. Pavlov, and
E. N. Rybin.
Identifiers: *Particle growth, *Carbonyls, *Condensation, Ussr, Aerosols, Condensation (atmospheric), Carbon monoxide, Chemical bonds, Photochemical reactions, Nucleation, Gases, Reaction mechanisms.

An investigation of the laws governing the development of molecular condensation nuclei yields information on the very initial stages of the formation of a new phase, which escape both direct experimental observation and correct theoretical examination. The technique for the production and measurement of molecular condensation nuclei serves as the basis for methods unique in their sensitivity for the direct counting of individual molecules, radicals, and even atoms; these methods make it possible to measure infinitesimal concentrations of impurities and to study the behavior and the properties of individual molecules, with long intervals of time between collisions with other homogeneous molecules. The development of the investigations of molecular condensation nuclei permits some clarification of questions arising in the discussion of questions relating to the nature of the phenomenon and to conditions for its experimental observation. A series of laws is presented which makes it possible to postulate, at least for the case of the appearance of activated molecules of metal carbonyls, the following picture of the process of the appearance of molecular condensation nuclei. Molecules of the metal carbonyls in a stream of inert gas with photochemical or thermal activation, and iron nonacarbonyl and iron tetracarbonyl spontaneously, lose their ligands (the CO-groups). The potentially freed chemical bonds are not used in a pure inert gas until supersaturated dioctylsebacate vapor is introduced into the stream. The molecules of dioctylsebacate join themselves to the nuclei of the initial molecules in the place of the ligands which have broken away; there is formed a new quasi-complex molecule, in which the role of the new ligands is played by large dioctylsebacate molecules. Good results are given after the union of two activated molecules of the hexacarbonyls: chromium, molybdenum, and tungsten (in the region of a quadratic dependence of n on m). The above concept of the mechanism of the development of molecular condensation nuclei cannot, of course, be considered exhaustive in a quantitative, or even in a qualitative respect. In reality, the phenomenon being considered is probably considerably more multiform and complex. However, the majority of the experimental facts obtained in the meanwhile agree with such a simplified picture of the process.
APTIC-24764

EFFECT OF SURFACE-ACTIVE AGENTS ON THE RATE OF ABSORPTION.

(Za vliyaniyeto na nyakoi pov'rkhnostno aktivni
veshchestva v'rkhu skorostta na absorbtsiya).
Text in Bulgarian. Izv. Inst. Obshta Neorg. Khim.
Org. Khim., Bulg. Akad. Nauk, vol. 8:73-81, 1961.
10 refs.
D. Mirev, D. Yelenkov, and Khr. Balarev.
Identifiers: *Surfactants, *Absorption, Europe, Acetylenes, Sulfur dioxide.

Experimental studies of surface-active substances, Nekal' BKh (dibunate sodium) and OP-10, on the absorption rate of acetylene and sulfur dioxide by water are reported. Horizontal column studies with acetylene showed no effect by these substances, but in a vertical-column arrangement the absorption curves showed minima for 0.03% Nekal' BKh and for 0.005% OP-10. Absorption rate minima were found in both vertical and horizontal arrangements in the case of SO2 absorption, the effect being greater in the horizontal case and occurring at a lower additive concentration (0.005% Nekal' BKh as compared to 0.02% in the vertical case). These effects are attributed to the nature of the surfactant and its influence on surface-layer hydrodynamics.
APTIC-24790

TURBULENT BUOYANT JETS INTO STRATIFIED OR FLOWING AMBIENT FLUIDS.

California Inst. of Tech., Pasadena, Dept. of Civil
Engineering, Thesis (Ph.D.), Ann Arbor, Mich.,
Univ. Microfilms, Inc., 1967, 429p. 35 refs.
Loh-Nien Fan.
Identifiers: *Dispersion, *Plume behavior, *Fluid flow, Combustion gases, Sewage, Electroconductivity analyzers, Design criteria, Mathematical analyses, Photographic methods, Turbulence (atmospheric), Flow rates.

Theoretical and experimental studies were made on an inclined, round buoyant jet in a stagnant environment with linear density stratification, and on a round buoyant jet in a uniform cross stream of homogeneous density. Using the integral technique of analysis, assuming similarity, predictions can be made for jet trajectory, widths, and dilution ratios, in a density stratified or flowing environment. Such information is of great importance in the design of disposal systems for sewage effluent into the ocean or waste gases into the atmosphere. The present study of a buoyant jet in a stagnant environment has extended the Morton type of analysis to cover the effect of the initial angle of discharge. Laboratory experiments were conducted for photographic observations of the trajectories of dyed jets. In general, the observed jet forms agreed well with the calculated trajectories and nominal half widths when the value of the entrainment coefficient was taken to be alpha equal to 0.082, as previously suggested by Morton. The problem of a buoyant jet in a uniform cross stream was analyzed by assuming an entrainment mechanism based upon the vector difference between the characteristic jet velocity and the ambient velocity. The effect of the unbalanced pressure field on the sides of the jet flow was approximated by a gross drag term. Laboratory flume experiments with sinking jets which were directly analagous to buoyant jets were performed, while salt solutions were injected into fresh water at the free surface in a flume. Jet trajectories, dilution ratios, and jet half widths were determined by conductivity measurements. The entrainment coefficient, alpha, and drag coefficient, Cd, were found from the observed jet trajectories and dilution ratios. In the ten cases studied where jet Froude number ranged from 10 to 80 and velocity ratio k from 4 to 16, alpha varied from 0.4 to 0.5 and Cd from 1.7 to 0.1. The jet mixing motion for distances within 250 D was dominated by the self-generated turbulence, rather than the free-stream turbulence. Similarity of concentration profiles has also been discussed. (Author abstract)
APTIC-24797

HEAT TRANSFER AND OTHER EFFECTS OF AN ELECTRIC FIELD ON A PARALLEL FLOW HYDROCARBON DIFFUSION FLAME.

Ohio State Univ., Columbus, Dept. of Mechanical
Engineering, Thesis (Ph.D.), Ann Arbor, Mich.,
Univ. Microfilms, Inc., 1967, 158p. 52 refs.
Edwin Ray Pejack.
Identifiers: *Flame, *Heat transfer, *Hydrocarbons, *Electrical properties, Firing methods, Mathematical analyses, Diffusion, Propanes, Carbon monoxide, Oxygen, Combustion, Electric charge, Voltage.

Flat parallel diffusion flames of propane and air were formed in a flat combustion chamber; the wall on the fuel side served as an anode and the wall on the air side was the cathode across which a dc voltage of up to 3200 volts was impressed. Three flames at equal velocities with various proportions of propane were investigated, as well as one flame at a higher velocity. The combustion chamber was instrumented to measure local current density, local heat transfer rate, electric pressure, exhaust composition, and exhaust temperature as a function of applied voltage. A gradient in current density along the flame was responsible for an induced gas motion away from the flame in the ozone containing positive ions. Another interaction between the field and the flame was the onset of a flickering condition which, with increasing voltage, first appeared at upper parts of the flame. A parameter for describing flame instability was set up which indicated that conditions near the saturation voltage of the flame favored instability; a stabilizing parameter proportional to the concentration gradients in the combustion chamber was defined which indicated that the flame gets less stable in the regions further downstream. A third mechanism was the attachment of electrons to carbon particles or molecules in upper parts of the flame. The resulting electrically induced drift of the negative ions tended to reverse the trend of induced motion toward the cathode at lower parts of the flame. Electric interactions with the flame were found to affect greatly the heat transfer rates, especially near the base of the flame. The maximum current density was only of the order of eight microamperes per square inch of flame surface. Appreciable decreases in the amount of carbon monoxide and unburnt hydrocarbon were found to be obtained by the application of voltage; solid carbon formation was found to increase. It may be possible to control the emissivity of flames through the influence of the electric field on the formation, growth, or combustion of charged particles in the flame. (Author summary modified)
APTIC-24800

THE EQUILIBRIUM FLOW OF A GAS-PARTICLE SYSTEM.

(Die Gleichgewichtsstroemung eines Gas-
Teilchen Systems). Text in German. Deutsche

Versuchsanstalt fuer Luft- und Raumfahrt,
Aachen (West Germany), Inst. fuer Theoretische
Gasdynamik, DVL Rept. 884, Deutsche Luft- und
Raumfahrt RR69-34, 24p., June 1969. 5 refs.
CFSTI: N70-10811
I. Teipel.
Identifiers: *Fluid flow, *Gases, *Solids, *Thermodynamics, Germany, Flow rates, Temperature.

Equations were derived for the gas dynamic behavior of heterogeneous mixtures. The mixture consisted of a gas with suspended solid particles. The equilibrium state at which both gas and particles have the same velocity and temperature was considered. The new equations were converted to the known system by a simple reduction and thus solutions for various problems became manifest; but the results had to be interpreted in a new manner. The annology of the gas-particle system with the dynamics of homogeneous media and the phenomena of the unidimensional nonsteady flow, the three-dimensional steady flow, the vertical compression shock, and the oblique compression shock with and without heat supply were analyzed. The propagation velocity of small disturbances in the gas-particle system was found to be smaller than in the homogeneous system. The solid particles slowed down the process.
APTIC-24860

CONJECTURE ON A CONNECTION BETWEEN LIFT AND PARTICLE DISPLACEMENT.

AIAA (Am. Inst. Aeron. Astronaut.) J., 6 (9):1811-
1812, Sept. 1968. NTIS, DDC: AD 680649
Stanley Corrsin.
Identifiers: *Mathematical analyses, *Reaction kinetics, *Diffusion, Dispersion, Chemical reactions, Displacement.

Material (Lagrangian) coordinates show that the average turbulent dispersion of a passive contaminant is, in the absence of molecular diffusion, unaffected by isothermal, first-order chemical reaction. Turbulent dispersion is also unaffected by some more complex reactions under simple enough initial conditions. With molecular diffusion, even the first-order reaction affects the average turbulent dispersion.
APTIC-24882

A FORMATION AND MOVEMENT OF DROPLET (NO. 2) (IN GAS-LIQUID PHASE).

Kagaku Kogaku (Chem. Eng.), 31 (5):414-420,
1967. Translated from Japanese by A. Fukada,
Oak Ridge National Lab., Tenn., Reactor Div.,
14p., May 1970. NTIS: PB 192170T
Yoichi Takashima.
Identifiers: *Aerosol generators, Japan, Sprays, Droplets, Particle size, Design criteria, Mathematical analyses, Gases, Liquids.

The atomization of droplets formed through spray nozzles or rotating discs from gaseous particles is mathematically analyzed. The importance of atomization is noted for accelerating mass transfer and effecting smooth continuous combustion. Three types of fluid atomization are considered: breakup of a fluid jet, breakup of a thin fluid, and impact rupture of a droplet. Limits are defined for atomization by spray nozzles and rotating discs. Also analyzed are three equations commonly used to predict droplet size distribution.
APTIC-24884

MEASUREMNT OF THE LIFETIME OF THE A 1 PI STATE OF CO BY LEVEL-CROSSING SPECTROSCOPY.

Phys. Rev. Letters, 24 (13):705-708, March 30,
1970. 15 refs.
William C. Wells, and R. C. Isler.
Identifiers: *Level-crossing spectroscopy, *Carbon monoxide, *Life span, Mathematical analyses.

The lifetime of the upsilon equals 2 level of the A 1 pi state of carbon monoxide was measured by molecular level-crossing spectroscopy. Unlike previous experiments with molecules in which the Hanle effect was analyzed for individual rotation states, the present results were obtained from analysis of the composite level-crossing signal from all of the rotational states which are exicted by the entire A yields X (2,0) resonance band. The experimental result of tau (upsilon equals 2) equals 9.0 plus or minus 1.0 nsec is in good agreement with Hesser's value of 10.5 plus or minus 1.0 nsec obtained from phase-shift experiments. (Author abstract modified)
APTIC-24888

THE PHOTOELECTRON SPECTRA OF 02, N2 AND CO.

Phys. Lett., A, 31A (6):292-293, March 23, 1970. 18
refs.
O. Edqvist, E. Lindholm, L. E. Selin, and L.
Asbrink.
Identifiers: *Carbon monoxide, *Oxygen, *Nitrogen, Spectrophotometry, Spectrometry, Ionization, Ions.

The A 2 Pi upsilon state of 02 (plus) was observed in the photoelectron spectrum of 02. Its ionization energy is 17.045 eV. The intensity is only one-sixth of the intensity of the A 4 Pi upsilon state. The C 2Sigma (plus)upsilon state of N2 (plus) does not appear in the photoelectron spectrum of N2, as is also the case with the corresponding state of CO (plus). The rules for the appearance of ionic states in photoelectron spectroscopy are discussed. (Author abstract modified)
APTIC-24889

FLUORESCENCE AND PHOSPHORESCENCE OF SO2 VAPOR.

J. Chem. Phys., 49 (4):1784-1793, Aug. 15, 1968. 31
refs. NTIS, DDC: AD 680506
H. D. Mettee.
Identifiers: *Sulfur dioxide, *Fluorescence, *Phosphorescence, Quenching, Vapors.

Stern-Volmer constants for sulfur dioxide fluorescence for six optically exciting wavelengths (3130, 3020, 2960, 2750, and 2650 A) show a regular decrease in going to shorter exciting wavelengths in the pressure range 1-1000 micron Hg. Due to earlier work by Douglas, it is inferred that the principal change is occurring in the fluorescence lifetime, which decreases accordingly. If electronic quenching takes place at every gas-kinetic collision, then any amount of vibrational relaxation which occurs prior to emission has a larger-than-gas kinetic cross section. The fluorescence yields go to unity at zero pressure, within liberal error limits, for all exciting wavelengths. The phosphorescence essentially disappears at pressures below 10 micron and does not originate from vibrationally excited triplet levels even at low pressures. The phosphorescence yields pass through a minimum at an excitation wavelength of 2850 A, and the corresponding values at the excitation wavelength extreme are about the same. (Author summary modified)
APTIC-24894

BENZO (A)PYRENE AND BENZ (A)ANTHRACENE.

(Benzo (a)pyren und Benz (a) anthracen). Text in
German. Ann. Chem., vol. 716:102-105, 1968. 7
refs.
Emil Buchta, and Rober Zoellner.
Identifiers: *Anthracenes, *Benzo (3-4)pyrene, *Chemical reactions, Germany, Benzopyrenes, Reaction mechanisms.

The Michael addition of 1-oxo-2-hydroxymethylene-1,2,3,4,5,6,7,8-octahydroanthracene (lb) to vinyl- (2-methoxycarbonyl-ethyl)-ketone (2a) leads to 1-oxo-2 (3-oxo-5-methoxycarbonylpentyl)-1,2,3,4,5,6, 7,8-octahydro anthracene (3a) which with sodium methylate in absolute alcohol yields 2-oxo-2,3,4,4a,5,6,8,9,10,11-decahydrobenz (a)anthracene-acetic acid- (1) (4a). With anhydrous hydrofluoric acid 11-hydroxy-1-oxo-1,2,3,4a,4,5,7,8,9,10-decahydro-benzo (a)pyrene (5) forms which following distillation with zinc dust and Pd/charcoal dehydration yields benzo (a)pyrene. -By analogy (lb) and methylvinylketone yields 1-oxo-2 (3-oxo-butyl)-1,2,3,4,5,6,7,8-octahydroanthracene (3b) and 2-oxo-2,3,4,4a,5,6,8,9,10,10-decahydro-benz (a)anthracene (4b). The secondary alcohol obtained from (4b) with LiAlH4 is dehydrated with Pd/ charcoal to benz (a)anthracene.
APTIC-24905

THE ROLE OF DIFFUSIVITY IN TURBULENT DISPERSION.

Stanford Univ., Calif., Dept. of Chemical
Engineering, Thesis (Ph.D.), Ann Arbor, Mich.,
Univ. Microfilms, Inc., 1967, 68p. 29 refs.
Gary Don Bizzell.
Identifiers: *Dispersion, *Mathematical analyses, *Brownian movement, Diffusion, Point sources, Fluid flow.

The Lagrangian description of diffusion in the presence of fluid motions was analyzed using the concepts of a Markov random process. The solution for the concentration field, resulting from a point source placed at the origin as the initial condition, is represented by an integral of a probability density function over the space of particle paths connecting the origin with the Eulerian independent variables of position and time, (X,t). The functional integral for the concentration results from repeated application of the Chapman-Kolmogorov relation from the theory of stochastic processes and represents a conditional probability of finding a particle at (X,t) under the condition that it began its trajectory at the origin. Considerable effort is given to the physical meaning of this result, and applications of these results is made to the Townsend-Saffman problem for interactions of molecular diffusion with turbulent dispersion. (Author abstract)
APTIC-24909

TRANSFER VALUES OF CARBON MONOXIDE IN NORMAL HUMANS IN A STABLE VENTILATION STATE AT REST.

(Les valeurs du transfert de l'oxyde de carbone
chez l'homme normal en etat ventilatoire stable au
repos). Text in French. J. Franc. Med. Chir.
Thorac. (Paris), 21 (4):365-382, May-June 1967. 13
refs. (Presented at the meeting of la Societe
Francaise de Pathologie respiratoire, Jan. 15,
1967.)
G. T[illegible]nquet, A. M. Clauzel, R. Carre, and Andre
Meyer.
Identifiers: *Transfer values, *Ventilation (pulmonary), *Carbon monoxide, Age, Males, Females, Breathing, Oxygen diffusion, Smoking, Cardiovascular diseases, France.

A survey of the values of carbon monoxide transfer in normal humans at rest was carried out on 191 individuals, both at a Naval medical survey center and at Boucicaut Hospital in Paris. Average rough values of DLCO were 21.9 ml/min/mmHg in men and 13.9 in women. The great variability of the mean values was an incitement to consider the main factors of pulmonary diffusion changes, namely age and smoking, which impair diffusion, while over-ventilation and larger body-surface enhance it. A number of ways of expressing the measure of transfer were considered. It looks as if preference should be given to the relation DLCO/V which makes it possible to take into account the greatest number of parameters involved. Its mean value was 0.0027. Yet this ratio is far from perfectly convenient and its variations are hardly negligible, in proportion to the amplitude of the tidal air. Interpretation must therefore be cautious, particularly because of the importance of outside factors such as the cardio-vascular condition. (Author abstract modified)
APTIC-24931

THE CURRENT STATUS OF CANCER RESEARCH.

For primary bibliographic entry see Field 07.
APTIC-24971

SEDIMENTATION OF POWDERED SOLIDS.

(Zur Sedimentation pulverfoermiger
Festkoerper). Text in German. In: Jahrbuch der
Fraunhofer Gesellschaft 1968/1969, Fraunhofer-
Gesellschaft, Munich, West Germany, p. 11-14,
1969. 4 refs.
G. A. Dyckerhoff, and P. J. Sell.
Identifiers: *Particulates, *Sedimentation, *Surface properties, Glass, Metals, Mineral products, Plastics, Surface coatings, Germany, Particle growth, Reaction mechanisms, Wetting, Electrical properties.

In the study of the differing sedimentation and agglomeration of solid particles in different liquids which is a typical energetic-boundary surface problem it is advantageous to differentiate between solid particles with high and such with low boundary surface energy. The former include inorganic salts, minerals, metals and glass, the latter plastics, paraffin, and amines. The sedimentation behaviour of particles of the first category is governed by the polarity of the liquid. Inorganic salts agglomerate fast in non-polar liquids and attain high sedimentation volume and velocity. Sedimentation of particles f the second category does not depend on the polarity of the liquid which has been demonstrated by the different sedimentation of glass particles before and after coating with silicon, that is, after having been transformed from a high energy to a low energy state. In the latter case the surface tension of the sedimentation liquid accounts for the different agglomeration volume and velocity. This relationship applies however only when the surface tension of the sedimentation liquid exceeds that of the solid particle and the liquid wets the particle only incompletely.
APTIC-24973

REACTION OF NITROGEN OXIDES WITH BIOLOGICALLY IMPORTANT AMINES.

In: Project Clean Air. California Univ., Santa
Barbara, Dept. of Chemistry, California Univ.
Res. Proj. S-7, 12p., Sept. 1, 1970. 6 refs.
C. A. Bunton.
Identifiers: *Pyridines, *Nitrogen oxides, *Decomposition, Toxicity, Colorimetry, Nitrous acid, Amines, Nitrous oxide (n20), Ions, Reaction mechanisms, Ph.

Oxides of nitrogen dissolve in water to give nitrous acid, which is itself toxic, and able to react with amines, which are biologically important compounds. The decomposition of the diazonium ion derived from a model compound, 2-aminopyridine was investigated. The diazonium ion is stable, as the diazotate ion, at high pH, but decomposes rapidly in acid. Therefore it could migrate about the body before decomposing at some region of low pH where it would generate a very reactive cation which could disrupt many biological systems. The reaction between nitrous acid and biologically important amines can be followed colorimetrically using a method for analysis of nitrous acid. An analysis method was developed. The toxic effects of the nitrogen oxide may be related to these chemical properties of nitrous acid, and it is desirable to explore methods for protecting the body from nitrous acid. Such a method using ascorbic acid is suggested, based on known chemical reactions. This approach is based on the premise that complex biological reactions are made up of a series of relatively simple chemical and physical processes, whose study can provide economically useful information relating in this case to health hazards. (Author abstract)
APTIC-25580

ADSORPTION OF HYDROCARBONS ON GRAPHITIZED CARBON.

For primary bibliographic entry see Field 02.
APTIC-25621

TERMINAL PROGRESS REPORT ON PUBLIC HEALTH SERVICE RESEARCH GRANT AP00349, 1/1/64 TO 12/31/68.

Harvard Univ., Cambridge, Mass., 3p., May 15,
1969. 3 refs.
G. B. Kistiakowsky.
Identifiers: *Fluorine compounds, *Isobutanes, *Photolysis, Butenes, Ethylene, Nitrogen, Carbon monoxide.

Research for the period 1/1/64 to 12/31/68, financed by Public Health Service Grant AP00349, is summarized. Some of the research is described in papers published by scientific journals. Some unpublished work described in a Ph.D. thesis is presented. The photolysis of 2,2,2-trifluorodiazoethane was carried out over a variety of conditions using standard photochemical techniques. Runs were also made with mixtures of carbon monoxide, nitrogen, and octafluorocyclobutane, and the reaction products were studied. Reactions mechanisms were postulated to explain butene/ethylene curves. Data on the reaction of methylene (generated photochemically from ketone) with iso-butane is discussed.
APTIC-25636

IMPROVEMENTS IN MACHINERY USED TO DRESS HIDES, SKINS, AND SIMILAR MATERIALS.

(Perfectionnements aux machines a refendre les
cuirs, peaux et matieres similaires). Text in
French. (The Turner Tanning Machinery Co.,
France) French Pat. 700,084. 5p., Feb. 24, 1931.
(Appl. Aug. 4, 1930, 6 claims).
Paul-Victor-Joseph Merenda.
Identifiers: *Leather, France.

A description is given of various accessories, adjustments, and other modifications designed to improve the operation of a machine that cuts apart hides used in the leather industry. The patented invention constitutes an improvement over previous types of such machinery, in that the counterfoil is not rigidly fixed, but is arranged in such a way as to give a wide range of settings, making it possible to use the machine for a wide variety of hide thicknesses.
APTIC-25644

REMOVABLE PROTECTIVE BAND OR BANDAGE FOR TIRE INNER TUBES.

(Bande ou bandage de secours amovible pour
chambre a air de pneumatique). Text in French.
(Assignee not given.) French Pat. 477,732. 2p.,
Nov. 8, 1915. (Appl. Feb. 25, 1915, 2 claims.)
Guire Mc.
Identifiers: *Tires, France.

The invention represents an advance in the field of protective wrappings for tire inner tubes being shipped in a deflated condition, making use of a series of flaps that interlock. Such devices are already known, but the invention provides: a series of overlapping articulations that provide flexibility in the capacity of the wrapping, and a securing pin that holds the wrapping in a secure position, so that the deflated tube will not be cut by the edges of the wrapping articulations during the deflation process.
APTIC-25646

'REFA' REFRACTORY TILE FOR SMOKESTACKS.

(Boisseaux de cheminees refractaires 'REFA').
Text in French. Ind. Ceram., no. 621:601-602,
Sept. 1969.
F. Haasser.
Identifiers: *Stacks, *Refractories, Asphyxiation, Clay, France, Absorption, Carbon monoxide, Water, Permeability, Surface properties.

Refractory, heat-insulating tile for use in a 3-walled smoke stack has a length of 50 cm and thickness of 2-4 cm. It is composed of a refractory clay, with a density of 1.85 plus or minus 0.1, a water absorption rate of 8-12 wt% per second, and gas permeability of 30 cubic centimeters per second per square cm of surface. The chimney was tested at 3 levels to determine its ability to withstand extremes of heat and cold and the amount of water absorbed by the tile, which amounted to 10.5%. The purpose of the new type of chimney is to reduce the danger of asphyxiation from carbon monoxide.
APTIC-25652

A STUDY OF THE MECHANICS OF TURBULENT GAS-SOLID SHEAR FLOWS.

Preprint, American Society of Mechanical
Engineers, New York, 10p., 1965. 15 refs.
(Presented at the American Society of Mechanical
Engineers, Winter Annual Meeting Chicago, Ill.,
Nov. 7-11, 1965, Paper 65-WA/FE-24.)
R. L. Peskin, and H. A. Dwyer.
Identifiers: *Fluid flow, *Gases, *Suspended particulates, Particulates, Turbulence (atmospheric), Solids.

In areas of application such as air pollution, rocket exhaust, and nuclear power, the study of flowing mixtures of gas and solid particles is of importance. A study of gas mean-velocity profiles and solid mean-velocity profiles was undertaken for a horizontal suspension of small particles suspended in turbulent air. Small pitot tubes were used to measure air velocity profiles, and small fiber-optic instruments were developed for solids velocity-profile measurements. An analysis was made of the effect of the solids motion on the mean gas velocity, the laminar sublayer structure, and the shear stress at the wall. An evaluation was carried out of the slip velocity of solids and the contribution of solids motion to overall dissipation. (Author abstract modified)
APTIC-25657

A DOUBLE BRADSHER REACTION.

Chem. Ind. (London), 1967:2145-2146. 5 refs.
S. D. Saraf, and F. A. Vingiello.
Identifiers: *Polynuclear compounds, *Chemical reactions, *Reaction mechanisms, *Double bradsher reaction.

The first use of a double Bradsher reaction to produce polycyclic aromatic compounds is reported. When slightly more than two moles of the Grignard reagent derived from omicron-bromodiphenylmethane was allowed to react with one mole of 1,4-dicyanobenzene, the desired diketone, 1,4-bis (2-benzylbenzoyl)benzene was obtained as light yellow plates from ethanol. This was converted in one step into 1,4-bis- (9-anthryl)benzene with a mixture of 48% hydrobromic acid and glacial acetic acid at 230 deg for four hours. 1,4-Bis (2- (1-naphthylmethyl)benzoyl)benzene was readily converted into 1,4-bis (7-benz (a)anthryl)benzene.
APTIC-25659

SOLUBILITY OF SULPHUR DIOXIDE IN SATURATED MAGNESIUM BISULPHITE SOLUTION: TAPPI DATA SHEET 164; SOLUBILITY OF SULPHUR DIOXIDE IN SATURATED MAGNESIUM BISULPHITE SOLUTION: TAPPI DATA SHEET 165; SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 5 C: TAPPI DATA SHEET 166; SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 15 C: TAPPI DATA SHEET 167; SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 25 C: TAPPI DATA SHEET 168; SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 35 C: TAPPI DATA SHEET 169; SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 50 C: TAPPI DATA SHEET 170; SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 60 C: TAPPI DATA SHEET 171.

TAPPI, 39 (7):135A-142A, July 1956.
Personal Author Not Recorded.

Identifiers: *Solubility, *Magnesium bisulfite, *Sulfur dioxide, Magnesium compounds, Liquids, Pressure, Temperature, Sulfites.

Eight graphs are presented to describe the solubility of sulfur dioxide at partial pressures of 0 to 700 mm Hg in magnesium bisulfite solutions at 5, 15, 25, 35, 50, and 60 C.
APTIC-25672

CHANGES IN ROTATIONAL CONSTANTS IN SOME PI-SIGMA BANDS OF HCN AND N20.

J. Opt. Soc. Am., 46 (11):953-956, Nov. 1956. 6 refs.
D. H. Rank, T. A. Wiggins, A. H. Guenther, and J. N. Shearer.
Identifiers: *Infrared spectrometry, *Hydrocyanic acid, *Nitrous oxide (n20), Electrical properties.

The fact that certain rotational constants change with the vibrational state of the mooecule is well known. It is also true that the two substates of a Pi; state have slightly different values of rotational constants associated with them. The difference of the two B values in a Pi state is designated by q (usually of the order of .01/cm, while the difference of the two D' values is called mu (usually of the order of 10 to the minus 7th power/cm). The values of q and u are measured for one band of hydrocyanic acid with the aid of a Fabry-Perot etalon which has dielectric films for the reflecting surfaces. The method employed makes it possible to ignore the effect of phase changes due to reflections in the etalon, and a crude optical calibration of the spacer is all that is necessary. In addition, some other values for the Q branch of another band of HCN, and some values for the Q branch of one band of nitrous oxide are measured and the results are given. Resolution of 175000 is obtained with the Q branch of one band of HCN. Taking account of the finite slit width and the inevitable Doppler line broadening, the resolution attained is 95% of that theoretically to be expected for the double passed grating spectrograph employed in this investigation. (Author abstract modified)
APTIC-25673

LIQUIDUS CURVE OF THE GA-SE-TE SYSTEMS.

(Likvidus sistemy Ga-Se-Te). Text in Russian.
Azerb. Khim. Zh., no. 2:98-103, 1967. 9 refs.
P. G. Rustamov, and V. B. Cherstvova.
Identifiers: *Liquidus curve, *Ga-se-te system, Ussr, Metal compounds, Liquids, Solids, Temperature.

Literature on some crossections through phase diagram of systems Ga2Se-GaTe and SeTe-Ga is summarized. Based on studies of all described sections, the triangular liquidus diagram of the ternary system Ga-Se-Te was constructed with isotherms plotted for every 100 degrees. The ternary chemical compound of composition Ga2SeTe with a melting point 845 C is formed in the system. A series of solid solutions of system GA2Se3-Ga2Te3 and Se-Te is formed up to 4 and 5% (atomic) Ga, respectively. The studied system has three eutectic and three peritectic points, and 12 univariant curves (mixed crystallization). The region of separation into layers occupies the Ga apex of the triangular diagram.
APTIC-25675

CONDUCTION AND PUMPING IN DIELECTRIC LIQUIDS UNDER THE INFLUENCE OF AN APPLIED ELECTRIC FIELD.

Illinois Univ., Urbana, Charged Particle Research Lab., Grants USPh 00511 and AFOSR-68-1508, Rept. 1-70, 137p., Aug. 1970. 70 refs.
Kazutoshi Asano, and Charles D. Hendricks Jr.
Identifiers: *Fluid flow, *Ions, *Electric charge, Mathematical modeling, Liquids, Voltage, Pressure.

The charge injection mechanism from a metal to a dielectric liquid with an applied electric field was studied, as well as the fluid motion and pressure which result from motion of the injected charge. A non-uniform electric field system was constructed and corn oil and silicone oil were used as the dielectric liquid. The preliminary experiments were performed with a plane parallel geometry in which the effect of fluid motion is small. The current-voltage relations which were obtained are not simple exponential in form, but rather complicated. An empirical formula was proposed and the constants were evaluated. With an non-uniform electric field system the space charge limited theory, which assumes a sufficient charge supply at the emitter, was discarded and more precise computations were performed numerically for the experimental geometry. The experimental results indicate that the current and pressure are the same order of magnitude independent of the polarity of the applied voltage. A new interface potential model was proposed to explain these experimental observations. The experimental results also showed that the similar motion of flow inside the test cell as in the calculation was confirmed by the pressure measurement. The pressure and currents measured at 10 KV of applied voltage agreed reasonably with the computed values. However, the slope of curves with voltage increased showed the experimental results were smaller than the predicted values. (Author abstract modified)
APTIC-25684

A STUDY OF THE POSSIBLE MOVEMENT OF MICROOGRANISMS THROUGH SMALL ORIFICES. (FINAL REPORT).

NASA Contract NAS 1-7277, AVSSD-0219-68-RR, NASA-CR-66703, 69p., 1968. NTIS: N70-35877
Personal Author Not Recorded.
Identifiers: *Microorganisms, *Transport, *Fluid flow, Bacteria, Microscopy, Pressure, Fluorescence.

Studies were carried out to determine (1) if microbial penetration through a 0.001 in.-diameter hole was possible against various fluid flows at low pressures analogous to conditions prevailing for a sterlization canister in vacuum flight and (2) if microbial penetration through 0.006, 0.019, and 0.020 in.-diameter holes was possible against impeding differentials in pressures of up to 4 in. water for ambient pressures near one atm. The means utilized to detect bacteria that violated a test hole in a bio-barrier uniformly employed direct visualization of stained organisms using fluorescence miscroscopy. The results of tests performed in the low pressure region are inconclusive. In the atmospheric tests, it was consistently observed that orifice violations do not occur at impeding differential pressures greater than approximately 0.5 in. water. This result was established for orifice diameters 6-20 MILS, for challenges of about 1,000,000 spore-min/ml magnitude for particle sizes from one to approximately 50 micron. A simple model is presented for estimating probable numbers of violations for arbitrary orifice size, pressure differential, and challenge.
APTIC-25687

COMPLEX FORMATION OF IMIDAZOLE AND PYRROLE IN AQUEOUS PHASE AND PREFERENTIAL FIXATION OF 3,4-BENZOPYRENE BY THE MEDIUM.

(Complexion imidazole-pyrrole en phase aqueuse et fixation preferentielle du 3,4-benzopyrene par le milieu). Text in French. Compt. Rend., 249 (17):1728-1730, Oct. 28, 1959. 2 refs.
Simone Hatem.
Identifiers: *Benzo (3-4)pyrene, *Azoles, *Pyrrole, *Complexes, France, Ultraviolet spectrometry, Chemical bonds.

Pyrrole, which is practically insoluble in pure water, becomes soluble in it in the presence of imidazole. The solubility-limit isotherm of pyrrole in aqueous solutions of imidazole has a critical point at an imidazole content above which only homogeneous water-imidazole-pyrrole solutions exist and below which two liquid phases coexist. The complexion of pyrrole is indicated by an increase of the absorption of ultraviolet by the solution. It may be possible that the water-imidazole-pyrrole equilibrium states determine the direction of the synthesis of hemoglobin. In this context, the behavior of 3,4-benzopyrene (B) a very carcinogenic substance was studied, together with its isomer, the perylene (P), a noncarcinogenic substance. Pyrrole binds up to 2% of B and about 1% of P; imidazole binds a noticeable share of B and but traces of P. The homogeneous temporary water-imidazole-pyrrole system binds B under the same conditions as pure pyrrole and imidazole. The ultraviolet absorption spectrum of this quaternary solution reveals the presence of B, all absorptive bands of which are displaced towards longer wavelengths from their positions in ethanol, methanol, ether, and acetone solutions. Thus, the molecule of B is fixed in its entirety in the ternary system. Introduction of P into this system produces no perceptible modification of its spectrum. The presence of B in the ternary system alters its solubiltiy-limit isotherm by moving the critical point towards higher imidazole contents. Introduction of B in the ternary solution results in a rapid and intense darkening of it, while the introduction of P has no noticeable effect.
APTIC-25746

SIMULTANEOUS PHYSICAL SINGULARITY IN SPACE FILLED BY DUST-LIKE MEDIUM.

(Odnovremennaya fizicheskaya singulyarnost' v prostranstve, zapolnennom pylevidnoy sredoy). Text in Russian. Zh. Eksperi. Teor. Fiz., 53 (5):1699-1707, May 1967. 5 refs.
L. P. Grischchuk.
Identifiers: *Gravitational field, *Mathematical analyses, Ussr, Dusts.

The case when physical and coordinate singularity coincide in a space filled with a dust-like medium is analyzed theoretically on the basis of seven (one less than the maximum possible number) physically arbitrary functions in three variables. The solution thus obtained is unstable, a type of perturbation existing which will disrupt the region described by this solution. Physical singularity does not vanish, however, but rather the world lines of the dust-like particles are refocused and the singularity becomes nonsimultaneous.
APTIC-25749

SULFUR DIOXIDE.

Pamphlet G-3, 21p., 1964. 12 refs.
Personal Author Not Recorded.
Identifiers: *Sulfur dioxide, Regulations, Eye irritation, Health impairment, Stack gases, Odors, Chemical processing.

A comprehensive description of the compound sulfur dioxide and all of its associated handling problems is presented. Its composition, physical and chemical properties, methods of manufacture, and commercial uses are described. The types of containers available for SO2, including disposable cans, cylinders, tank cars, and portable tanks, are discussed, as well as the regulations pertaining to such containers. Storage methods for the various types of containers are detailed. Handling and withdrawing procedures for SO2 in both liquid and vapor phase are mentioned. Safety precautions should be taken when leaks are detected in containers. Even when equipped with a safety mask, the operator should remain in the contaminated area only long enough to make the necessary adjustments. Physiological effects of SO2 include irritation of the mucous membranes of the eyes, nose, throat, and lungs due to the formation of sulfurous acid. The physiological responses to various concentrations of SO2 are documented. SO2 is readily detected in concentrations of 4 ppm by its odor. First aid suggestions in the event of emergencies are included.
APTIC-25761

THE DYNAMIC BEHAVIOR OF AEROSOLS.

Ann. N. Y. Acad. Sci., 105 (2): 45-87, March 20, 1963. 9 refs.
F. E. Porter, W. L. Crider, R. I. Mitchell, and W. L. Margard.
Identifiers: *Bacteria, *Aerosols, *Transport, Particle size, Cascade samplers, Impingers, Mathematical analyses, Diffusion, Clouds, Humidity, Temperature (atmospheric), Flow rates.

When an aerosol moves within a duct, the change in particle concentration caused by settling and by turbulent diffusion to the duct wall can be related mathematically to particle size, distance and velocity of movement, physical properties of the material aerosolized and of the suspending medium, and the conditions of flow. The results of experimental work in which a dibutyl phthalate aerosol was moved through a duct at several velocities correlate well with the results obtained by the mathematical expression. Under conditions of laminar or turbulent flow, experimental values substantiate theoretically derived values for the change in concentration of particles up to 25 micron in diamater. The transport of aqueous aerosols containing bacteria and described by the change in bacterial concentration within particle-size fractions is more complex than the transport of dibutyl phthalate aerosols. Temperature, relative humidity, and velocity interact to influence the viability decay of the bacteria and the physical decay of the aerosol. Experimental work with aerosols generated from aqueous slurries containing Bg or Sm show that Sm perishes when drying conditions prevail. Velocity controls the effect of drying to the extent that it determines how long the aerosol is exposed to the adverse condition. Under the conditions of the experiments with bacterial aerosols, 80% of the particles generated usually can be transported 30 ft, the selected criterion of 'successful' transport, when viability decay is not a factor. Generally, fewer larger than smaller particles are transported at lower relative humidities, possibly because of evaporation. Sampling of static aerosol clouds reveals a decided loss of large particles containing Bg as temperature decreases, which might be caused by sedimentation. Other than the trials in which viability decay of Sm was evident, the changes in transport are neither striking nor always conclusive. Evaporation and sedimentation are expected to influence aerosol size consists during transport, but no hypotheses can be consistently applied to specific anomalies observed within the range of conditions investigated.
APTIC-25779

TEMPERATURE CHARACTERISTICS OF FIBRE FILTERS.

For primary bibliographic entry see Field 02.
APTIC-25798

PREPARATION OF RADIOACTIVELY LABELLED CONDENSATION AEROSOLS. I. AEROSOLS OF SODIUM CHLORIDE, SILVER IODIDE AND SULPHURIC ACID.

Collection Czech. Chem. Commun. (Prague), vol. 30:507-514, 1965. 17 refs.
K. Spurny, and V. Hampl.
Identifiers: *Condensation, *Radioactive tracers, Aerosols, Aerosol generators, Sulfuric acid, Silver iodide, Sodium chloride, Isotopes.

Procedures are described for preparing condensation aerosols of sodium chloride, silver iodide, and sulfuric acid labelled with Na24, J131, Ag110, and S33. The aerosols are prepared by sublimation of the solid phase or by evaporation of the liquid phase of inorganic substances in an electric furnace heated to adjustable and controlled temperatures. Dry gas passing through the furnace is enriched with vapors or aerosol particles of the substances used. After leaving the furnace, the gas with the aerosol is led to a condensor and then to a homogenizer, where the remaining vapor is condensed and the aerosol diluted. The particles are examined by electron microscope analysis. The three aerosols described were used to study aerosol filtration; concentrations from 10 to the minus 9th power to 10 to the minus eighth power were used. They should also enable rapid measurement of phase transformation, coagulation, and similar phenomena.
APTIC-25801

AN ASYMPTOTIC METHOD FOR SOLVING EQUATIONS OF BROWNIAN MOTION OF AEROSOL PARTICLES.

Dokl. Earth Sci. Sect. (English translation from Russian of: Doklady Akad. Nauk SSSR), 185 (3):7-9, Nov. 1969. 7 refs.
V. M. Voloshchuk.
Identifiers: *Aerosols, *Mathematical analyses, *Brownian movement, Ussr, Fluid flow.

An asymptotic method is developed for solving equations of Brownian motion of aerosol particles. The method is applied to solve specific problems connected with viscous flow around an obstructing body and to a case where the obstructing body is being streamlined and is reacting with aerosol particles. Conditions under which the effect of inertia on aerosol particle motion can be ignored are discussed.
APTIC-25807

PARTICLE TRAJECTORIES AND CAPTURE OF PARTICLES BY A SPHERE.

Kolloid Z. Z. Polym., 192 (1-2):101-107. 1963. 16 refs.
J. Rosinksi, J. Pierrard, and C. T. Nagamoto.
Identifiers: *Particle trajectories, *Particle deposition, United states, Aerosols, Mathematical analyses.

An equation estimating the number of particles deposited on a spherical sticky surface was derived. The angles of approach of the particles to the spherical surface were experimentally determined. The experiments were performed at conditions preventing formation of an excessive electrostatic charge on the collecting surface and on the particles. Under these conditions deposition of a single layer of particles was observed. (Author abstract)
APTIC-25827

THE FORMATION AND DECOMPOSITION REACTIONS OF THE ACETYL RADICAL AND THE HEAT OF FORMATION OF THE ACETYL RADICAL.

J. Phys. Chem., 69 (3):1022-1029, March 1965. 25 refs.
J. Alistair Kerr, and Jack G. Calvert.
Identifiers: *Acetyl radical, *Reaction kinetics, *Thermodynamics, Acetaldehyde, Methanes, Carbon dioxide, Decomposition, Photolysis, Ions.

The 3600-A photolyses of azomethane in the presence of either carbon monoxide or acetaladehyde were investigated and the formation and decomposition reactions of the acetyl radical were found to be dependent on the overall pressure in the system. The activation energies obtained for the decomposition and formation reactions of the acetyl radical are consistent with recent results of other investigations. A combination of the present results and other independent estimates gives the heat of formation (CH2CO) as equal to -4 plus or minus 2 kcal/mole. Results on the reaction CH3 + CH3CH0 yields CH4 + Ch3Co were obtained from the azomethane-acetaldehyde system, and, together with three other determinations, yield an Arrhenius equation. (Author abstract modified)
APTIC-25828

THE OXOSYNTHESIS OF PROPIONIC ALDEHYDE IN A THIN LAYER REACTOR.

(Ueber die Oxosynthese von Propionaldehyd im Duennschichtreaktor). Text in German.
Eidgenoessische Technische Hochschule, Zurich (Switzerland). Thesis (Ph.D.), Zurich Switzerland, P. Schmidberger, 1969, 73p., 87 refs.
Roland Fehr.
Identifiers: *Oxosynthesis, *Propionaldehydes, Europe, Ethylene, Cobalt compounds, Catalysts, Catalytic activity, Chemical reactions, Oxidation, Reaction kinetics, Temperature.

The oxosynthesis of propionic aldehyde from ethylene with a catalyst in solution (dicobalt octacarbonyl) in a thin layer reactor yielded 95% aldehyde partly in the form of trimeric paraproteinaldehyde at a constant reaction temperature maintained by the elimination of the generated reaction heat. The trimerization of propionic aldehyde to parapropionaldehyde was catalyzed by cobalt hydrogen carbonyl and took place outside the reactor at lower temperatures. This reaction can be suppressed by dilution with a solvent. Traces of oxygen in the synthetic gases cause a precipitation of cobalt propionate from the soluble cobalt carbonyl in the reaction product which is a simple method of recovering cobalt from oxoproducts. The use of cobalt hydrogen carbonyl in place of dicobaltoctacarbonyl increased the output (calculated on ethylene) considerably. A mathemtical model yielding results identical with experimental results achieved with both dicobaltoctacarbonyl and cobalt hydrogen carbonyl at 200 atm was derived from kinetic studies. The thin layer reactor was found to be well suited for the oxosynthesis of propionic aldehyde when reaction time was kept within narrow limits and when the reactor was suitably dimensioned.
APTIC-25830

THE THERMAL FORCE IN THE TRANSITION REGION.

J. Colloid Interface Sci., 23 (3):448-452, March 1967. 16 refs.
J. R. Brock.
Identifiers: *Suspended particulates, *Temperature gradient, *Flow rates, Particle size, Mathematical analyses, Gases.

A temperature gradient causes small particles suspended in the gas to migrate in the direction of decreasing temperature. The force arising from the temperature gradient causing particle migration is commonly termed the thermal force. A brief review is presented of theoretical and experimental results for the thermal force in the free molecule region. Next a theory is developed, with the momentum transfer method as the starting point, for the thermal force for large but finite Knudsen numbers. The close agreement between theory and experimental results suggests that most of the confusion in previous discussions of the thermal force in the transition region arose from ignorance of the important role of the accommodation coefficient. Some of the confusion also lies in comparing thermal force results for the same particle in monoatomic and polyatomic gases. The theory developed here for monoatomic gases can only serve as a qualitative guide for polyatomic gases.
APTIC-25832

THE REACTION OF ORGANIC ANIONS WITH CARBON MONOXIDE. (FINAL REPORT).

Massachusetts Inst. of Tech., Cambridge, Dept. of Chemistry, Army Research Grant DA-ARO-D-31-124-G691 and National Inst. of Health Grant GM16020, Rept. 5444, 7-C, 92p., 1970. 275 refs.
CFSTI, DDC: AD 702990
George M. Whitesides, and William H. Ehmann.
Identifiers: *Acetylenes, *Carbon monoxide, *Reaction mechanisms, Benzenes, Naphthalenes, Ketones, Chromium compounds, Lithium compounds, Catalytic activity, Hydrolysis, Ions.

The reaction mechanism of carbon monoxide with organolithium reagents is elucidated, and the reactions of dialkyl-substituted acetylenes with triarylchromium (III) compounds are explored. These two classes of reactions are conceptually related in the sense that the reactivity of acetylenes and carbon monoxide toward many organometallic reagents, particularly those of the transition metals, is similar. The broad outline of the former

mechanism is established. The initial step in the reaction involves formal insertion of carbon monoxide into an organolithium aggregate followed by partitioning of the resulting ketone dianion between two principal competing reaction paths leading ultimately after hydrolysis to benzhydryl phenyl ketone, benzhydrol and benzophenone as the principal reaction products. This work is of interest as a potential entry into the chemistry of ketyls and ketone dianions, and for its elaboration of a unique mechanistic pathway for a reaction of an organolithium reagent. The cyclooligimerization of 2-butyne to 1,2,3,4-tetramethylnphthalene on reaction with triphenyltris (tetrahydrofuran)chromium (III) involves initial insertion of acetylene into a carbon-chromium sigma-bond, followed by elimination of benzene with formation of an intermediate metallocycle. This work establishes a basis for rational application of organochromium reagents in certain types of organic synthesis, in addition to providing the most clearly established description available for cyclooligimerization of an acetylene using a transition metal catalyst. (Author abstract modified)
APTIC-25852

INVESTIGATION OF THE ABSORPTION OF INFRARED RADIATION BY ATMOSPHERIC GASES.

Philco-Ford Corp., Newport Beach, Calif.,
Aeronutronic Div., OAR Contract F19628-69-C-0263, Proj. 5130, Order 1366, TR-1, AFCRL-70-0373, U-4829, 50p., June 1970. 10 refs. NTIS, DDC: AD 709894
Darrell E. Burch, David A. Gryvnak, and John D. Pembrook.
Identifiers: *Infrared spectrometry, *Carbon dioxide, Absorption, Nitrogen, Infrared radiation, Gases.

From spectral transmittance curves of very large samples of carbon dioxide, coefficients are determined for intrinsic absorption and pressure-induced absorption from approximately 1130 reciprocal cm to 1835 reciprocal cm. Most of the pressure-induced absorption arises from the forbidden Vsub1 and 2 Vsub2 bands of the O16C12O16 molecule, and the major portion of the intrinsic absorption arises from the same bands of the O16C12O18 molecule. Curves of the absorption coefficients for samples of CO2 pressurized to approximately 10 atm, or more, with Helium are presented throughout most of the region from 1885 reciprocal cm to 2132 reciprocal cm. These curves and a table of the integrated absorption coefficient are adequate to determine the strengths of most of the bands of significance in this region. Spectral transmittance curves of CO2 absorption between approximately 2065 reciprocal cm and 2100 reciprocal cm are presented for a variety of samples. Curves of the pressure-induced absorption by nitrogen are presented for the 2400-2650 reciprocal cm region. (Author abstract modified)
APTIC-25853

USE OF THERMODESORPTION TECHNIQUE FOR STUDYING GAS ADSORPTION: CARBON MONOXIDE ON NICKEL.

J. Colloid Interface Sci., 34 (3): 401-405, Nov. 1970. 13 refs.
Alan W. Smith.
Identifiers: *Adsorption, *Carbon monoxide, *Thermal radiation, Hydrogen, Nickel compounds, Oxidation, Reduction, Reaction kinetics, Thermodynamics, Temperature.

The adsorption of carbon monoxide on a nickel sample with (111) and (100) faces exposed was studied by the thermodesorption technique. Both oxidation-reduction and argon-ion bombardment were used to clean the surface. The effect of annealing after argon-ion bombardment was determined. Thermodesorption peaks for states with activation energies of desorption of 13, 27, and 39 kcal/mole were identified. The activation entropy of desorption increased linearly with the square root of the activation energy. The presence of hydrogen during carbon monoxide adsorption at elevated temperatures gave rise to a new carbon monoxide state of higher desorption energy. (Author abstract)
APTIC-25866

PREPARATION OF RADIOACTIVE SULFUR DIOXIDE FROM BARIUM SULFATE.

J. Am. Chem. Soc., vol. 72:1841-1842, April 1950.
Rowland E. Johnson, and J. L. Huston.
Identifiers: *Sulfur dioxide, *Radioactive radiation, Barium compounds, Sulfur trioxide, Oxygen, Phosphorus compounds, Sulfates, Combustion.

Details are presented of a method for producing radioactive sulfur dioxide by combustion in oxygen of an intimate mixture of radioactive barium sulfate and red phosphorus. Sulfur dioxide prepared by this method contains less than 0.1% sulfur trioxide. The combustion is effected by means of a gas train consisting of standard flow equipment.
APTIC-25929

AUTOMOTIVE STARTING AND WARM-UP RESPOND TO GASOLINE VOLATILITY.

For primary bibliographic entry see Field 01.
APTIC-25931

OXIDATION OF ETHYLENE BY THE PHOTOLYSIS OF NO2 AT 25 C.

J. Chem. Phys., 48 (6):2805-2809, March 15, 1968. 12 refs.
Sigmund Jaffe, and James Keith.
Identifiers: *Ethylene, *Nitrogen dioxide (no2), *Reaction mechanisms, *Photolysis, Oxidation, Photochemical reactions, Photooxidation, Pressure, Temperature.

Ethylene was irradiated at 2600 A in the presence of nitrogen dioxide at 25 C. Quantum yields were determined as a function of ethylene pressure, NO2 pressure, and the total pressure (using N2). The quantum yields for NO2 disassociation increased as a function of (C2H4) and approached a value greater than 2. A mechanism that fits the quantum-yield data and explains the formation of products in the early stages of photolytic oxidation of ethylene assumes that the addition of oxygen atoms to ethylene produces an energy-rich intermediate which dissociates into CH3 and CHO. This is followed by rapid reaction of the radicals with NO2 to produce stable products.
APTIC-25941

CRYSTAL STRUCTURE DETERMINATION OF STABLE OZONIDES.

Preprint, Baylor Univ., Waco, Tex., 5p., 1969. 2 refs.
James L. McAtee Jr.
Identifiers: *Crystal structure, *Ozonides, Computers, Ozone, Sulfur compounds, Diffraction.

Crystal structure determinations were made of ditertbutylcyclophene-1,1 dioxide ozonide (BOZ) and 3,4-dimethyl-2,5 dihydrothrophene -1,1 dioxide ozonide (SOZ). The unit cell dimensions and space group symmetry were determined by regular diffraction methods, following which the crystals were examined by means of a quarter circle single crystal goniometer on an XRD-5 GE diffractometer. These results produced intensity values that were digitized and transferred to punch cards to tapes for use in the computer. Simultaneous to calculations to determine the atomic locations by the symbolic addition method, attempts were made to alter the BOZ compound by the addition of high atomic numbered atoms such as halogens. These attempts to get a heavy atom into the structure so that the structure could be more readily determined were without success. Preliminary calculations only were carried out on the structure of the sulfurated ozonide.
APTIC-25953

THE THERMODYNAMIC PROPERTIES OF SULFUR DIOXIDE.

J. Phys. Colloid Chem., vol. 54:601-605, May 1950. 4 refs.
James R. West, and Gino P. Giusti.
Identifiers: *Sulfur dioxide, *Thermodynamics, Pressure, Temperature.

In the literature, the thermodynamic properties of sulfur dioxide extend from -100 to 500 F and from 0.294 to 1000 psia. The results of calculations extending the data to 2000 F are given. The new data are combined with the existing data in pressure-enthalpy diagram for sulfur dioxide.
APTIC-25954

THERMODYNAMIC FUNCTIONS FOR NITROGEN DIOXIDE AND NITROUS ACID.

J. Phys. Chem., vol. 61:251-253, 1957. 20 refs.
A. P. Altshuller.
Identifiers: *Nitrous acid, *Nitrogen dioxide (no2), *Thermodynamics, Nitric oxide (no), Oxygen, Ozone, Reaction kinetics, Electrical properties.

Because of the importance of nitrogen dioxide and nitrous acid in such diverse fields as air pollution and rocket fuel application, thermodynamic functions were calculated for the compounds at 100 to 1000 K. Values reported for nitrous acid include both the trans and cis forms and equilibrium mixtures of the two forms. Vibrational frequencies determined for the trans and cis isomers are also given. In addition, thermodynamic properties are presented for the following reactions at 200 to 1500 K: nitric oxide + 1/2 02 (oxygen) in equilibrium with NO2 and NO + ozone in equilibrium with NO2 + 02. The second reaction, because of its kinetic aspects, is of special interest in air pollution problems.
APTIC-25958

CHEMICAL MODELS FOR COMBUSTION AND ATMOSPHERIC POLLUTION.

Preprint, Combustion Inst., Pittsburgh, 17p., 1969. 32 refs. (Presented at the Combustion Institute Fall Meeting, 1969.)
Andrew M. Stein.
Identifiers: *Combustion products, *Combustion, Carbon black, Fuels, Mathematical modeling, Hydrazines, Hydrogen, Nitrogen, Nitrogen oxides, Oxygen, Reaction kinetics, Reaction mechanisms, Thermodynamics.

Chemical models for combustion and the end products which may give rise to atmospheric pollution are described in terms of a general arbitrary system Carbon-hydrogen-nitrogen-oxygen. The role of chemical thermodynamics is discussed and used to define the major products of combustion for the system: unsymmetrical dimethyl hydrazine-hydrazine-nitrogen tetraoxide. Cellulose fuels when burned in air are C-H-N-O systems. Therefore, the fuels may be studied by methods similar to that of the system UDMH-N2H4-N2O4. Evidence is reported which supports the suggested equilibrium treatment for defining major combustion products, and the non-equilibrium treatment for chemi-ionization and certain minor species. (Author abstract)
APTIC-25963

CONTRIBUTION TO THE THEORY OF ELECTRICAL CHARGING OF AN AEROSOL.

Staub (English Translation from German of: Staub, Reinhaltung Luft, 30 (4):13-16, April 1970. 5 refs.
Erwin Doetsch, and Hans-Adolf Friedrichs.
Identifiers: *Ions, *Electric charge, *Aerosols, Germany, Mathematical analyses, Diffusion.

The electric charging of an aerosol is investigated theoretically. In the case of a single charging by ion diffusion, in the presence or absence of an external field, it is possible to give approximation equations for the charging rate. In the case of strong external fields, ion bombardment must also

be taken into consideration. In this case it is possible to derive differential equations by simple addition of the charging rates of the two individual mechanisms; if there is an oversupply of ions, accurate solutions can be found for these equations which, in other cases, can only be solved approximately. (Author summary modified)
APTIC-25980

KINETIC EVIDENCE CONCERNING THE GEOMETRY OF SUBSTITUTED METHYL RADICALS.

J. Chem. Phys., 42 (12):4265-4267, June 15, 1965.
14 refs.
S. W. Benson, D. M. Golden, and K. W. Egger.
Identifiers: *Iodinated hydrocarbons, *Methanes, *Chemical bonds, Ethylene, Free radicals, Reaction kinetics, Reaction mechanisms, Crystal structure.

A previous report that cis or trans di-iodoethylene will rapidly exchange iodine atoms with I2 via an I-atom addition to the double bond (relative to much slower geometrical isomerization) is shown to be compatible with a planar structure for the intermediate free radical. A tetrahedral structure for the free-radical end would lead to nearly equivalent rates of exchange and isomerization. A recent suggestion that the stable form of the beta-iodo-alkyl radical is I bridged is shown to be incorrect, and this observation is explained in terms of the I atom catalyzed, concerted addition of I2 to the olefin. (Author abstract)
APTIC-25985

PROPAGATION VELOCITY AND FLAME SPREAD THROUGH SIMULATED FUEL BEDS.

American Society of Mechanical Engineers, New York, Incinerator Div., Proc. Natl. Incinerator Conf., Cincinnati, Ohio, 1970, p. 288-303. 17 refs.
(May 17-20.)
J. P. Stumbar, M. Kuwata, T. J. Kuo, and R. H. Essenhigh.
Identifiers: *Flame spread, *Propagation velocity, *Incineration, Mathematical analyses, Simulation, Heat transfer, Combustion.

Mayers' theoretical analysis for flame spread through fuel beds was modified by the addition of radiative conductivity. The modified theory was tested by comparison with results obtained from experiments on a fuel bed simulated by a set of dowel rods in a combustion pot. The rods are ignited at the top, and flame spreads downward. The results are valid up to the ignition point of the bed, and the calculated temperature profile is in agreement with the experimentally derived profile. These results show that the assumption of an effective thermal conductivity, as assumed by Mayers, is unnecessary for calculating the temperature profile in a fuel bed and that radiative heat transfer plays a minor role in heating such a bed to ignition temperature. (Author abstract modified)
APTIC-25989

ELECTRODYNAMIC BEHAVIOR OF CHARGED AEROSOL PARTICLES IN AN INHOMOGENEOUS ALTERNATING FIELD AND POSSIBILITIES OF ITS APPLICATION IN DUST ENGINEERING.

(Elekrodynamisches Verhalten aufgeladener Aerosolteilchen im inhomogenen Wechselfeld und seine Anwendungsmoeglichkeiten in der Staubtechnik). Text in German. Staub, Reinhaltung Luft, 30 (11):449-456, Nov. 1970. 34 refs.
Senichi Masuda, Koichi Fujibayashi, and Kengo Ishida.
Identifiers: *Aerosols, *Aerodynamics, *Electrical properties, Japan, Dusts, Computers, Simulation, Transport, Electric charge, Voltage.

The electrodynamic behavior of charged aerosol particles in an imhomogenous alternating field was investigated with regard to the possibility of application in dust technology. A series of insulated parallel cylindrical electrodes charged with an alternating current forms inhomogeneous alternating fields. Electrically charged aerosol particles move along the lines of force of the fields which thus form an electric curtain. An enclosed aerosol cloud can by this arrangement be transported in any desired direction. Depending on the arrangement and type of electrodes, an electric curtain of standing wave type, an electric curtain of travelling wave type, and an electric hopper curtain can be produced. The particle motion can be simulated and precalculated with the help of a computer. The electrodynamic barring force and transport velocity of the above types of electric curtains are calculated and checked out experimentally and by the simulation method.
APTIC-26041

ABOUT SULFUR DIOXIDE AND DIMETHYLANILINE.

(Om svaveldioxid och dimetylanilin). Text in Swedish. Suom. Kemistiseuran Tiedonantoja, 65 (1):19-25, 1956. 16 refs.
T. Brehmer, and P. Nirkko.
Identifiers: *Thermodynamics, *Sulfur dioxide, *Dimethylaniline, Europe, Organic nitrogen compounds, Surface properties, Vapor pressure.

In view of conflicting reports from various authors on values of the heat of vaporization and vapor pressure given by various authors in the literature on sulfur dioxide-dimethylaniline systems, new determinations were made. The partial pressure of the SO2 was determined by the interferometer method of P. Nirkko and by a modified version of the volumetric method used by T. Brehmer. The pressure figures obtained were used to estimate the total heat required to dissolve SO2 in dimethylaniline. A quantity of 1.6652 grams of SO2, the vapor pressure at 288 K of which was determined by the volumetric method at 0.126 mm Hg, was added to 1120.6 grams of dimethylaniline to obtain a solution with a concentration of .00281. The interferometer determinations of the SO2 pressure for this solution ranged from 0.172 mm Hg at 203 K to 0.055 at 279 K.
APTIC-26091

A STUDY OF THE DECAY PROCESSES IN THE TRIPLET SULFUR DIOXIDE MOLECULE EXCITED AT 3828.8 A.

Preprint, Ohio State Univ., Columbus, Dept. of Chemistry and Ohio State Univ., Columbus, ElectroScience Lab., 29p., 1970. 19 refs.
Howard Sidebottom, Charles Badcock, Jack G. Calvert, George Reinhardt, and Blaine Rabe.
Identifiers: *Triplet sulfur dioxide, *Decay processes, Sulfur dioxide, Phosphorescence, Reaction mechanisms, Pressure.

Triplet sulfur dioxide molecules were generated by the absorption of a 3828.8 A laser pulse, and the lifetimes of the excited species were determined from 0.16-17.7 torr in experiments at 25 deg. The data, for which rate constants are derived, fit a Stern-Volmer quenching mechanism. In another set of experiments, comparative phosphorescence emission intensities were measured in pure SO2 and from biacetyl-cyclohexane mixtures. The data provide an estimate of the quantum yield of phosphorescence of triplet sulfur dioxide molecules at zero pressure. All of the results confirm previous finding that a first-order, nonradiative decay of triplet sulfur dioxide is more important than radiative decay for the isolated moleculate at low pressures. The mechanism of the process may involve simply the intersystem crossing of the triplet molecule to the isoenergetic vibrational levels of the ground state, or a unimolecular rearrangement of the triplet to some thermally unstable, high-energy, isomeric form of SO2 which reverts nonradiatively to ground-state SO2.
APTIC-26152

THE DECAY MECHANISM OF TRIPLET SULFUR DIOXIDE MOLECULES FORMED BY INTERSYSTEM CROSSING IN THE FLASH PHOTOLYSIS OF SO2 (2400-3200 A).

Preprint, Ohio State Univ., Columbus, Dept. of Chemistry, 26p., 1970. 13 refs.
Kiyoshi Otsuka, and Jack G. Calvert.
Identifiers: *Triplet sulfur dioxide, *Photolysis, *Phosphorescence, Sulfur dioxide, Reaction mechanisms, Pressure, Temperature.

The lifetimes of triplet sulfur dioxide molecules were measured in 190 different phosphorescence intensity-time experiments, at 25-100 deg and 13-366 micron. The triplet-state species were generated by intersystem crossing from excited singlet molecules formed in the flash photolysis of SO2 (2400-3200 A). Reciprocal lifetimes at various pressures and temperatures are listed, and Stern-Volmer plots are presented for the typical lifetime data from three experiments. The plots show an upward curvature at pressures below 60 micron. The parameters that control the low pressure phenomenon were discovered by estimating the difference between the reciprocals of the observed lifetimes and the corresponding predicted values found from an extrapolation of the linear portion of the Stern-Volmer plots. The difference was found to be proportional to the reciprocal of the SO2 concentration and independent of temperature. It is concluded that a significant fraction of the triplet sulfur dioxide molecules diffuse to the wall and is deactivated heterogeneously in runs at low pressures. Rate constants for the homogeneous quenching reactions of two excited triplet sulfur dioxide reactions are derived for runs at pressures above 70 micron. The sum of the rate constants is disucssed in terms of its applicability to the reaction 3SO2 + SO2 yields SO + SO3.
APTIC-26154

STUDIES ON DROPLET SIZE SPRAYED FROM HOLLOW CONE NOZZLES.

Kagaku Kogaku (Chem. Eng.), 34 (2):204-210, 1970. 12 refs. Translated from Japanese by A. Fukada, Oak Ridge National Lab., Tenn., Reactor Div., 11p., May 1970. NTIS: PB 192136T
Shiro Matsumoto, Nobuyuki Sakai, Yoichi Takashima, and Yoshitoshi Tago.
Identifiers: *Aerosol generators, *Droplets, *Particle size, Japan, Statistical analyses.

Geometrical mean size and logarithmic standard deviation characterizing log normal distributions of droplets sprayed from hollow cone nozzles were experimentally determined. Geometrical mean size decreased with increasing pressure and increased with increased nozzle diameter and increases in physical properties. Geometric standard deviation was increased by viscosity but was decreased by surface tension and by increasing nozzle diameter. It was unaffected by pressure. Equations were derived which describe the experimental results. The rate of atomization is weakened by heat transfer phenomena. In such cases, log normal distribution must be corrected by considering minimum droplet size.
APTIC-26194

ELECTRONIC ABSORPTION SPECTRA OF INORGANIC AND ORGANIC COMPOUNDS OF NITROGEN. I. NITROGEN DIOXIDE-DINITROGEN TETROXIDE IN SOLUTION.

J. Phys. Chem., vol. 62:607-610, 1958. 25 refs.
(Presented at the American Chemical Society, 132nd National Meeting, New York, Sept. 1957.)
Aubrey P. Altshuller, Donald Stephens, and Carol Meyers Schwab.
Identifiers: *Amines, *Nitrogen dioxide (no2), *Ultraviolet spectrometry, Solvents, Esters, Ethers, Olefins, Ketones, Reaction mechanisms, Temperature.

The ultraviolet absorption spectra for nitrogen dioxide-dinitrogen tetroxide mixtures were determined in various polar and nonpolar solvents. In nonpolar solvents the spectrum is very similar to

NO2-N2O4 mixtures in the gas state. However, in solvents with unshared electron pairs available, particularly ethers, esters, ketones, and tertiary amines, a complex multibanded spectrum is observed at room temperature. This spectrum appears to be characteristic of NO2-N2O4 in those solvents and to be the result of the same electron donor-acceptor type molecular complexes previously reported in the literature at lower temperatures in the solid state. Reactions occurring, and the products formed, in mixtures of nitrogen dioxide and olefins and n-alkyl amines are discussed. (Author abstract modified)
APTIC-26253

7. EFFECTS - HUMAN HEALTH

PREDICTING HUMAN PERFORMANCE IN SPACE ENVIRONMENTS.

Harvard School of Public Health, Boston, Mass., Guggenheim Center for Aerospace Health and Safety, Contract NGR 22-007-070, Rept. NASA-CR -1370, 175p., June 1969. 75 refs.
Warren H. Teichner, and Diane Olson.
Identifiers: *Thresholds, *Spacecraft atmospheres, Adults, Adaptation, Research methodologies, Temperature (atmospheric), Carbon monoxide, Oxygen.

The ability of an astronaut to carry out his tasks may be threatened by the environmental variations to which he is exposed. It is important, therefore, that limits of exposure be established and that the design of the astronaut's environment, the nature of the tasks, and the scheduling of effort be given rigorous, technical consideration. An attempt to systematize the description of tasks and performance in a manner applicable both to the analysis of environmental literature and to the operational situation is presented. Relationships are postulated and developed between environmental conditions and major physiological effects thought to result from them, and general criteria are developed for determining the environmental conditions which should be considered limiting. The general theory of the research and its method of application are presented, and application of the basic concepts to three specific environmental areas is discussed. The contamination of an environment in the form of carbon monoxide excess or reduced oxygen partial pressure is considered. The effects of positive transverse acceleration, thermal, and acoustical variations in a closed environment are studied.
APTIC-12612

ANNOTATED BIBLIOGRAPHY OF LITERATURE ON BERYLLIUM.

National Academy of Sciences-National Research Council, Washington, D. C., Advisory Center on Toxicology, 26p., June 23, 1969. 99 refs.
Personal Author Not Recorded.
Identifiers: *Berylliosis, *Beryllium, *Beryllium compounds, Litigation, Epidemiology, Occupational health, Toxic tolerances, Carcinogens, Metal poisoning, Asbestosis.

An annotated bibliography of all literature on beryllium which was acquired by the Advisory Center on Toxicology of the National Research Council during 1968 is presented. A total of 99 articles are mentioned. Some of the articles are quite old, others are very recent. Some of the topics mentioned include carcinogenicity, litigations, occupational problems, berylliosis, therapy, asbestiosis, epidemiology, toxic tolerances and others.
APTIC-12829

PLEURAL CALCIFICATION AS A ROENTGENOLOGIC SIGN OF NON-OCCUPATIONAL ENDEMIC ANTHOPHYLLITE-ASBESTOSIS.

Acta Radiol., Suppl. 194:1-67, 1960. 77 refs.
Raimo Kiviluoto.
Identifiers: *Calcification, *Asbestosis, *Radiography, Mortality, Pathological techniques, Autopsy, Lungs, Pneumoconiosis, Europe, Dusts, Mining, Calcium compounds.

An investigation was conducted into the incidence of cases with pleural calcification without an adequate history of pulmonary or pleural disease or injury. Between 1957 and 1959, 126 cases of pleural calcification of this kind were found among 39,000 roentgen examinations of the chest. Roentgenologically, inhalation damage appeared probable, but there was no clinical symptoms of pneymoconiosis or history of occupational exposure to dusts. Calcification in these cases had a different character than that due to disease; the deposit was located on the parietal pleura and usually occurred bilaterally. Basal and mediastinal calcification was also observed, but there was no interlobular calcification. Clinically the patients had no subjective or objective respiratory symptoms. The salient feature was the endemic occurrence of the majority of the cases in the Kuusjaervi commune in Finland. Two anthophyllite asbestos mines are located near the center of this area. These provide the common external factor, asbestos, which has considered the most probable causative factor. Some histopathologic and mineralogic examinations were made to confirm the etiology and pathogenesis; fibrous asbestos was identified in the lung of one autopsied case. A theory as to the pathogensis of calcium deposits is presented. A survey of the literature, with reference to pleural calcification and pneumonoconioses, is also included. (Author summary modified)
APTIC-22195

THE THREAT POSED BY DUST AND INDUSTRIAL GASES EMITTED BY CENTRAL HEATING PLANTS AND OTHER AIR POLLUTION SOURCES.

(Peligrosidad de los polvos y gases industriales, emitidos por las centrales termicas y otras fuentes de contaminacion del aire). Text in Spanish. Quim. e Ind. (Bilbao), 14 (6):195-206, Nov.-Dec. 1967. 21 refs.
Jose M. Pertierra.
Identifiers: *Heating plants, *Respiratory diseases, Air pollution episodes, Lung cancer, Europe, Dusts, Coal, Industrial emission sources, Stacks, Particle size, Electrostatiic precipitators, Height finding, Carbon dioxide, Carbon monoxide, Sulfur dioxide.

Summarized and discussed are the dangers to human lungs from the particulate content of industrial emissions, as well as calculation of chimney height, use of purification equipment, and the harmful effects of gaseous pollutants (carbon dioxide, carbon monoxide, and sulfur dioxide). A study by a local agency in Oviedo, Spain, of the atmospheric dust content in the immediate vicinity of a large central heating plant using low quality coal at the rate of 1200 tons per day, showed an output of 1200 dust particles per cu cm of air, 170 of which were of a diameter smaller than 7 microns. The Spanish city of Aviles formerly received 350 tons of fine coal dust from the central heating plant of ENSIDESA. After reports were received of high incidence of lung diseases and lung cancer, electrostatic filters were installed, 99% effective, which considerably alleviated the health problems in that city. There is still much public apathy concerning air pollution in Spain.
APTIC-22246

TOXICOLOGIC ASPECTS OF FLAMMABILITY AND COMBUSTION OF POLYMERIC MATERIALS.

J. Fire Flammability, vol. 1:239-268, July 1970. 28 refs. (Presented at Polymer Conference Series, 'Introduction to Flammability and Characteristics of Polymer Materials,' University of Utah College of Engineering, June 15-20, 1970.)
John Autian.
Identifiers: *Toxicity, *Plastics, *Aliphatic hydrocarbons, *Combustion, Health impairment, Textiles, Chlorides, Cyanides, Fluorides, Aromatic hydrocarbons, Carbon dioxide, Carbon monoxide, Nitrogen oxides, Sulfur dioxide, Oxygen, Hydrogen sulfide.

The toxicity problems which may result from the burning or heating of manmade polymeric materials (plastics, elastomers, and textiles) are reviewed at length. After a general discussion of the burning of manmade materials and of toxicology in real fire situations, the effects of some of the more important thermal degradation products are summarized, including carbon monoxide; sulfur dioxide, hydrogen sulfide, hydrogen fluoride, chloride, and cyanide; aliphatic hydrocarbons, aromatic hydrocarbons, nitrogen compounds, and epoxy compounds. Toxic effects from polymer 'fumes' and from smoke are also considered. The literature on laboratory experiments on the toxicity of these products is reviewed, and the need for the development of standardized toxicity testing procedures is stressed. Three levels of toxicity testing are proposed: level I deals with 'life and death' possibilities, level II with toxic effects at sub-lethal concentrations in animals, and level III with ultimate prediction of toxicity on the basis of pertinent data about the degradation products. It is emphasized that, besides the prime attention traditionally accorded to acute toxicity, toxicity consideration must be extended to include possible health effects from lower concentration of the gases and exposures over longer time periods now that new materials are being used for all types of items, including housing units, and with increasing air pollution from industrial process or from municipal trash incineration. An extensive introduction to toxicology is included as an appendix.
APTIC-24153

FLUORINE GASES IN ATMOSPHERE AS INDUSTRIAL WASTE BLAMED FOR DEATH AND CHRONIC POISONING OF DONORA AND WEBSTER, PA., INHABITANTS.

Chem. Eng. News, 26 (50):3692, Dec. 1948.
Personal Author Not Recorded.
Identifiers: *Fluorine compounds, *Air pollution episodes, *Donora, Humans, Corn, Plant damage, Mortality, Valleys, Smog, Hydrofluoric acid, Carbon monoxide, Sulfur dioxide.

Circumstantial and actual proof was found of acute fluorine poisoning by the smog in the Monongahela River Valley to persons who already had chronic fluorine intoxication according to the official report of investigations of the causes of the death of 17 people in Donora, Pa., and of 3 in Webster. Besides being saturated with soot, the fog blanket also contained sulfur dioxide, carbon monoxide, and hydrofluoric acid. Analysis of blood of deceased and hopitalized victims showed 12 to 25 times the normal quantity of fluorine. Corn crops, very sensitive to fluorine, were severely damaged, and all of the vegetation north of the town was killed.
APTIC-24580

PNEUMONIA IN THE AREA OF THE SAUDA FACTORIES OF RYFLYKE.

Tidsskr. Norske Laegeforen., vol. 49:553-568, 602-612, 1929. Translated from Norwegian. 25p.
K. Wefring.
Identifiers: *Primary metallurgical processing, *Ryflyke, *Norway, *Pneumonia, Humans, Epidemiology, Mortality, Iron, Manganese, Europe, Viruses, Smokes.

A description is provided of an investigation in a Norwegian town wherein the residents were blaming a high incidence of pneumonia accompanied by an abnormally high mortality rate on the smoke from a local ferromanganese plant. It is concluded that the function of the plant in the spread of the disease is to provide the point of contact for the contageous transfer of a highly virulent strain of pneumococcus; no case could be presented for causation by the smoke or any of its constituents. The remedy suggested is innoculation of the inhabitants and isolation of pneumonia patients.
APTIC-24586

TOXICITY OF NO2 VAPORS AT VERY LOW LEVELS. A PRELIMINARY REPORT.

Arch. Ind. Hyg. Occupational Med., vol. 6:20-21, July 1952. 9 refs.

Edward LeB. Gray, James K. MacNamee, and Stanley B. Goldberg.

Identifiers: *Respiratory diseases, *Nitrogen dioxide (no2), *Vapors, Maximum allowable concentration, Rats, Occupational health, Emphysema, Pneumonia, Nitric acid.

Forty rats were divided into groups of 10 and exposed to red fuming nitric acid containing 9-14 ppm nitrogen dioxide for four hrs at a time. Total exposure for the different groups ranged from 40-96 hrs. Animals examined shortly after the termination of exposure had inflammatory respiratory tracts and exhibited evidence of severe rhinitis and tracheitis in the upper portion of the tract, along with less severe pneumonitis. Pneumonia developed in a few of the animals. In many of the animals sacrificed eight or more weeks after exposure, the inflammation had subsided, but there were localized areas of emphysema in all lobes of the lungs. With the exception of moderate congestion, liver, spleen, kidney, and brain showed no pathological changes. Length of exposure had no effect on the changes observed. In view of the fact that nitrogen dioxide concentrations higher than 8 ppm produce damage in rats, it is concluded that the maximum allowable concentration of 25 ppm, the value set by the American Standards Association and others, is too high.

APTIC-24588

AIR POLLUTION CONTROL: HEALTH ASPECTS AND MICROTECHNIQUES.

For primary bibliographic entry see Field 03.

APTIC-24603

THE METABOLISM OF LEAD IN MAN IN HEALTH AND DISEASE. PART II. THE METABOLISM OF LEAD UNDER ABNORMAL CONDITIONS.

J. Roy. Inst. Public Health Hyg., vol. 24:129-143, June 1961. 5 refs. PART I. Ibid, vol. 24: 81-97, April, 1961. PART III. Ibid., vol. 24:177-203, Aug. 1961.

Robert A. Kehoe.

Identifiers: *Humans, *Metabolism, *Lead, Occupational health, Urinalysis, Blood cells, Ingestion, Breathing, Health impairment, Metal poisoning, Particulates, Particle size, Absorption, Tetraethyl lead.

Abnormal lead metabolism is characterized by quantitative changes which result from unusual conditions of exposure, often induced by industrial operations. When the rate of absorption of lead is increased beyond the range described as normal, there is a prompt change in the rate of excretion of lead. Experiments involving the regular ingestion of lead are described, and the results are discussed. Details of the lead output in the urine and the lead level in the blood are mentioned. After the termination of a period of abnormal absorption, a variably prolonged period of elimination of the accumulated lead ensues. A series of experiments involving the response of subjects to the inhaltation of inorganic compounds of lead dispersed in particulate form in the atmosphere is described. These experiments were designed to establish the effects of concentration, particle size, and duration of exposure upon the absorption and excretion of lead.

APTIC-24614

FUNDING FOR 1968 PUBLIC NUISANCE INVESTIGATION RESEARCH: PATHOLOGICAL-CHEMICAL RESEARCH OF THE HUMAN LUNG POLLUTION BY AIR POLLUTION.

(Showa 43 nendo kogai chosa kenkyu itakuhi: taiki osen ni yoru jinhai osen ni kansuru byorisoshikikagakuteki kenkyu). Text in Japanese. 57p., 1969 (*). 10 refs.

Personal Author Not Recorded.

Identifiers: *Research programs, *Respiratory system, Rats, Humans, Pathological techniques, Deposition, Respiratory diseases, Japan, Urban areas, Dusts, Exposure chambers, Metal compounds, Sulfur dioxide.

Since 1965, research funds have been available through the Ministry of Health and Welfare for the pathological-chemical study of the pollution of the human lungs by air pollution. The basic aim of the studies is to show pathologically and chemically what types of substances settle in the lungs due to air pollution, and what types of afflictions these substances cause. The research Topics for 1968 were as follows: study of microscopic determination of the rate of adhesion of carbon powder in a human cadaver, the relationship between lung diseases and black dust, pathology of lung pollution, pathological study of respiratory systems in the Yokkaichi air pollution area, pathological study of the respiratory system of a rat inhaling sulfur dioxide, construction of an aerosol concentration adjusting room that includes an automatic concentration regulator device, study of the content of trace elements in human organs, study of areal characteristics of the atmosphere due to metallic components in dusts, and 1968 research results in the pathological studies of polluted lungs.

APTIC-24616

CARCINOGENIC HYDROCARBONS AND RELATED COMPOUNDS IN PROCESSED RUBBER.

For primary bibliographic entry see Field 01.

APTIC-24629

EXPERIMENTAL CARCINOGENESIS OF THE LUNG. II. INFLUENCE OF PHENOLS IN THE PRODUCTION OF CARCINOMA.

J. Nat. Cancer Inst., 39 (2): 175-186, Aug. 1967. 8 refs.

Russell Tye, and Klaus L. Stemmer.

Identifiers: *Lung cancer, *Phenols, Mice, Carcinogens, Coal tars, Anthracenes.

Coal tars from by-product coke ovens were separated into phenolic and nonphenolic fractions. Various combinations were used to produce aerosols to which five groups of male mice were exposed two hours, three times weekly, for up to 55 weeks. Animals were killed at intervals. The lungs and trachea of all mice were examined grossly and microscopically for neoplasms or relevant morphological changes. Significant alterations seen in the exposed animals were squamous metaplasia, intrabronchial or peripheral adenomas, and adenocarcinomas. After 46 weeks, 32 survivors in groups that received phenols had four incidences of adenocarcinoma, 19 of intrabronchial adenoma, and 10 of squamous metaplasia. In 20 survivors of a group that recieved no phenols, there was no incidence of adenocarcinoma, 11 incidences if intrabronchial adenoma, and 2 of squamous metaplasia. The occurrence of adenocarcinomas and squamous metaplasia appeared to be correlated with the joint administration of phenols and a tar containing 8-methylbenz (a)anthracene. (Author abstract modified)

APTIC-24633

THE CONDITIONAL BIOLOGICAL ACTIVITY OF THE CARCINOGENS IN CARBON BLACKS, AND ITS ELIMINATION.

Cancer Res., 14 (2):103-110, Feb. 1954. 10 refs.

Paul E. Steiner.

Identifiers: *Carcinogens, *Carbon black, Mice, Lungs, Tissues, Cancer, Lung cancer, Skin cancer, Tumors, Adsorption, Benzo (3-4)pyrene.

A carbon black from which 3,4-benzpyrene and other aromatic hydrocarbons could be eluted with benzene was carcinogenic on subcutaneous test in mice when it was injected with tricaprylin, but practically inactive in pellet form. This difference in result is interpreted as showing that the subcutaneous tissues had no eluent adequate to make the chemical available for carcinogenic action on the adjacent cells. These experiments illustrate three principles in carcinogenesis, namely, the existence of 'natural' carcinogenic compounds; the occurrence of conditional carcinogens; and the importance of the solvent in the carcinogenic response. A carbon black whose benzene extracts contain no recognized carcinogenic hydrocarbons was slightly carcinogenic on biological test. It is probable that adsorbed carcinogenic chemicals were present which were not eluted in vitro but which became available for carcinogenic activity in vivo, indicating that the biological test for carcinogenicity was better than the chemical. When the potent carcinogenic aromatic hydrocarbon, 3,4-benzpyrene, in an amount which when tested alone gave a 95% tumor yield, was added to a noncarcinogenic carbon black of small average particle diameter prior to injection, no tumors were induced by the combination. This inactivation is attributed to adsorption, and it is interpreted as signifying that in the adsorbed state this carcinogen was rendered biologically inactive. The carcinogenic activity of a carbon black was eliminated by destruction and by adsorption; it was nearly eliminated by solvent extraction. The phenomenon of adsorption was a more potent factor than the solvent in determining the carcinogenic response under the experimental conditions used. The principles of natural and conditional carcinogens, of solvent elution, and of adsorption are advanced to explain some clinical and epidemiological observations on human skin and lung cancers, and on the role of preceding pathological lesions in predisposing to pulmonary tumors. (Author summary modified)

APTIC-24640

MECHANISM OF TOXIC VAPOUR UPTAKE BY LUNG. I. EXPERIMENTAL APPARATURE RECORDING ORGANIC VAPOUR CONCENTRATIONS IN EXPIRED AIR.

(Mechanismus vstrebavani toxickych par plicemi. I. Pokusna aparatura pro sledovani prubehu koncentrace organickych par ve vydechovanem vzduchu). Text in Czech. Pracovni Lekar. (Prague), 22 (6):201-206, 1970. 18 refs.

Karel Bocek, and Radim Nemecek.

Identifiers: *Respiratory functions, *Spectrophotometry, *Aromatic hydrocarbons, Diagnosis, Metabolism, Breathing, Ventilation (pulmonary), Toxicity, Czechoslovakia, Design criteria, Experimental equipment, Experimental methods, Chlorinated hydrocarbons, Vapors.

Factors are discussed which affect the relation between concentration of organic vapors in inspired air and the rate of uptake by the organism. On the basis of this analysis and experience from previous experiments, properties of experimental apparatus and the arrangement of the experiment are stipulated. Block schemes of apparatus and some details on design are included. The analytical part of the apparatus is constructed as a spectral photometer in the UV region with automatic registration. The necessary sensitivity of the apparatus was achieved by designing a gas cuvette with threefold passage of light. The device makes it possible to measure vapor concentrations of organic solvents (aromatic compounds, chlorinated hydrocarbons) up to concentrations of 1 micro g/l in 100 ml expired air. There is also a description of an apparatus for preparation of defined concentrations of organic vapors in a dynamic atmosphere constant within limits of plus or minus 1% for a period of 8 hours. The experimental set makes it possible to measure simultaneously the course of concentration in expired air, minute ventilation, breathing frequency, physical load, and to measure indirectly cardiac output and metabolic rate during an experiment lasting several hours.

APTIC-24648

PROPOSAL FOR A UNIFORM EVALUATION OF THE DANGER OF PNEUMOCONIOSIS.

(Ein Vorschlag zur einheitlichen Bewertung der
Pneumokoniosegefahr). Text in German. Staub,
Reinhaltung Luft, 30 (8):326-327, Aug. 1970.
Lajos Szirtes.
Identifiers: *Occupational health, *Pneumoconiosis, Maximum allowable concentration, Age, Health statistics, Breathing, Europe, Dusts, Statistical analyses.

No criteria exist hitherto for the categorization and proof of danger from dust inhalation which are needed for the estimation of the risk to which workers are exposed, for the determination of indemnity payments by insurance companies, for determination of necessary dust removal measures required, and for legislative purposes. Recent statistical studies have shown that the most reliable data about the danger of the incidence of pneumoconiosis can be obtained from the ratio of the percentage share of the incidence of pneumoconiosis by age at start of work and work years in the various age groups and the total work force. A uniform system of 2 coordinates- age at start of work, and work years- is proposed for calculating the degree of danger of pneumoconiosis in a specific enterprise with the maximum possible degree of danger (danger index) being expressed by the number 1000 which takes into account all known and unknown factors.
APTIC-24649

PLEURAL SURFACE PRESSURE IN DOGS.

J. Appl. Physiol., 27 (6): 881-885, Dec. 1969. 15
refs.
S. M. McMahon, D. F. Proctor, and S. Permutt.
Identifiers: *Diagnosis, *Pulmonary function, Dogs, Lungs, Experimental equipment, Pressure.

A surface pressure measuring device using pairs of Starling resistors was employed to measure end-expiratory pressures in the pleural space of dogs. The resistors, when used in the prescribed way, transduce changes in pressure upon their sensitive rubber membranes into changes in air flow through a pneumotachograph. With this device the pleural distortion in minimal and well away from the sensitive portion of the sensor. Pressures were analyzed in terms of body tilt position and posture upon a tilt table. In supine animals in the horizontal position, the pressures acting on the craniad and caudad sensors were alike. In animals placed in the right-side-down posture, the sensors were most nearly alike in the 45 deg head-up position, but not in the horizontal position. This difference may represent the influence of the heart and mediastinal structures on pleural surface pressure. The intrapleural pressure gradient in the right-side-down posture was 0.16 cm H_2O/cm for the 90 deg head-up position and 0.21 cm H_2O/cm for the 90 deg head-down position. In the supine posture, the average gradients were 0.20 cm H_2O/cm for the 90 deg head-up and 0.31 cm H_2O/cm for the 90 deg head-down positions. (Author abstract modified)
APTIC-24664

AIR POLLUTION; VI. BRONCHIAL-PULMONARY ALTERATIONS CAUSED BY AIR POLLUTION.

(La Contaminacion Atmosferica; VI. Alteraciones
broncopulmonares causadas por contaminacion
aerea). Text in Spanish. Gac. Med. Mex., 100
(3):285-287, March 1970.
Raul Cicero, and Patricia Alonso.
Identifiers: *Respiratory diseases, Humans, Age, Smoking, Alveoli, Allergies, Bronchial cancer, Lung cancer, Eye irritation, Metal poisoning, Bronchitis, Bronchopneumonia, Emphysema, Pneumoconiosis, Pulmonary edema, Urban areas, Beryllium compounds, Cobalt compounds, Vanadium compounds, Sulfur dioxide.

On the basis of the relatively sparse data available in Mexico, it seems evident that allergy-type processes, tracheitis, bronchitis, bronchiolitis, hypertrophic or atrophic emphysema, bronchiolectasis, and granulomatosis of the alveolar membranes are more frequent among inhabitants of Mexico City than among those living in rural areas. The relationship between pulmonary neoplasia and the various pollutants is rather debatable but it is clear that pre-existing conditions are aggravated, and that smokers and older people are more frequently affected by pollution. The high levels of sulfur dioxide in such places as Torreon, Monterrey, Guadalajara, Tampico, Cuernavaca, Ciudad Madero and Minatitlan are known to cause rhinitis, conjunctivitis, and acute and chronic bronchospasms. Poisoning from cobalt, vanadium, beryllium, platinum, and various types of plastics, the symptoms of which are well known in the field of occupational medicine, have a high rate of occurrence among those who live in the neighborhood of industries where these substances occur. Some new types of pulmonary disease, such as diffuse bronchiolectasis, eosinophile granuloma, and interstitial fibrosis (Hamman and Rish) may very well be traceable to air pollution. In addition to an impressive variety of changes in pulmonary tissues, blood vessels, blood cells, and the pleura, pulmonary edema is very frequent, possibly a reaction of the body's defense system, intended to relieve the irritation caused to the lungs, analogous to the reaction of the tear glands when the eyes are irritated. The liquid content of the edema may be reabsorbed, or it may become proteinized, the result being a pathology similar to that of alveolar proteinosis. Such a syndrome has been encountered following exposure to certain metallic salts, such as those of cobalt. A low level of contamination is thought to be associated with pulmonary allergies, tracheitis, bronchitis, and bronchiolitis. The 'focal' type of pulmonary emphysema is that most commonly associated with pollution.
APTIC-24668

AIR POLLUTION; I. INTRODUCTION.

(La contaminacion atmosferica; I. Introduccion).
Text in Spanish. Gac. Med. Mex., 100 (3):255-257,
March 1970.
Horacio Jinich.
Identifiers: *Epidemiology, Humans, Industrial areas, Internal combustion engines, Vehicles.

The attitude toward science and technology has changed drastically in the last few years, upon the discovery that a heavy price has been paid for achievements in terms of environmental pollution. Of the various pollution problems, that of the air is the most critical. The problem is most acute in the large population centers, in proportion to the industrial advances made and to the extent that internal combustion motors are used for transportation. Although the toll has been costly in terms of damage to building materials and vegetation, the most serious problem posed is to human health. Statistical correlations have been found between pollution epidemics and mortality, between the level of air pollution and frequency of illness in large population centers studied for long periods of time, between exposure to pollution and clinical studies of individuals, and in data obtained from animal experiments. Whereas science and technology have been the source of pollution, they also provide the only means of controlling it. Such control will be expensive, and will require the cooperation of every force in society. The medical profession, with its traditional role of safeguarding human health, should lead the way in this all-out effort.
APTIC-24670

THE JOINT ACTION OF ATMOSPHERIC POLLUTIONS ON MAN.

(K voprosu o kombinirovannom deystvii
atmosfernykh zagryazneniy na organism
cheloveka). Text in Russian. Gigiena i Sanit., 35
(8):98-99, 1970.
M. S Goldberg.
Identifiers: *Synergism, *Toxicity, *Research methodologies, Maximum allowable concentration, Chronic, Animals, Laboratory animals, Humans, Ussr.

The practice of simply totaling the combined toxicities of a number of substances present in a given air pollution situation does not allow for the real possibility of antagonistic interaction between toxic substances resulting in reduced effective toxicity of one or more of them; such an approach can lead to unreasonable and impractical restrictions on air pollution. It is also suggested that time-consuming chronic studies with test animals be dispensed with once the effects on humans of the substance in question have been clearly established.
APTIC-24688

DETERMINATION OF THE COEFFICIENT OF THE VITALLY NECESSARY VOLUME OF THE LUNGS OF CHILDREN.

(K opredeleniyu koeffitsiyenta dolzhnoy
zhiznennoy emkosti legkikh u detey). Text in
Russian. Gigiena i Sanit., 35 (8):115-116, 1970. 4
refs.
V. S. Kokin.
Identifiers: *Children, *Pulmonary function, Age, Males, Females, Ussr.

A recent study of 564 boys an.. 470 girls provides consistent but more detailed information on the coefficient of vital capacity for children. Average values for boys ranged from 1.55 at age 7 to 2.30 at age 16; corresponding values for girls are 1.40 and 2.10.
APTIC-24690

SCIENTIFIC AND PRACTICAL MEANS OF STUDYING THE JOINT ACTION OF SMALL CONCENTRATIONS OF TOXIC SUBSTANCES IN THE AIR.

(O nauchno-prakticheskom podkhode k
izucheniyu kombinirovannogo deystviya malykh
kontsentratsiy toksicheskikh veshchestv
atmosfernogo vozdukha). Text in Russian. Gigiena
i Sanit., 35 (8):99-102, 1970. 14 refs.
M. I. Gusev.
Identifiers: *Synergism, *Toxicity, Maximum allowable concentration, Humans, Ussr.

Soviet research into the combined effect of toxic substances in the atmosphere is reviewed. In view of the complexity of this problem, it is recommended that each actual case of simultaneous presence of gaseous toxicants in the atmosphere be studied to determine minimum effective and maximum ineffective concentrations. Such study is especially needed in cases of high concentrations, or when other factors (dust and noise) are present, or when additional toxic substances gain entry to the organism by other routes (in water and food).
APTIC-24692

DUST FALL IN THE VICINITY OF CEMENT FACTORIES AS IT RELATES TO POSSIBLE HEALTH HAZARDS; PART 2.

(Ueber den Staubanfall in der Umgebung von
Zementwerken im Hinblick auf moegliche
Gesundheitsschaeden. II. Mitteilung). Text in
German. Arch. Hyg. Bakteriol. (Munich), vol.
151:211-220, Aug. 1967. 13 refs.
H. J. Einbrodt, H.-J. Dietze, E. Korchhoff, W.
Oberthuer, and D. Hentschel.
Identifiers: *Respiratory system, *Cements, *Dusts, *Mineral processing, Seasonal, Humans, Age, Females, Bronchitis, Quartz, Germany, Silicon dioxide.

The properties of cement dust of interest to the biologist are discussed and the dust content of cement plants analyzed, together with an analysis of its chemical and mineralogical composition, attention is given to the effects of the dust on human health. Despite excessively high concentrations of this dust in the respiratory tract, fibrous changes in the lungs of people residing in such an area is not attributed to the presence of SiO_2, due to the relatively low quartz content in the dust. Preliminary studies of the incidents of bronchitis indicate that women residing in the cement plant area do

not experience a higher bronchitis rate than those residing in other communities of a comparable size. When the data were broken down according to the seasons of the year, there was again no significant difference to be found in the comparison. When classified in terms of age, however, it was discovered that the bronchitis rate reached a peak among younger people in areas not related to the cement industry, while there was a higher incidence among older people in the area adjoining the cement plant.
APTIC-24708

EYE IRRITATION FROM AIR POLLUTION.

J. Air Pollution Control Assoc., 10(1):17-20, Feb. 1960. 11 refs. (Presented at the Air Pollution Control Association Annual Meeting, 52nd, Los Angeles, Calif., June 21-26, 1959.)
C. H. Hine, M. J. Hogan, W. K. McEwen, F. H. Meyers, and S. R. Mettier.
Identifiers: *Eye irritation, *Sulfur dioxide, Rabbits, Humans, Smog, Acrolein, Nitrogen dioxide (no2), Ozone, Vapors.

Two series of experiments on animals and humans are reported. Rabbits were exposed once for 4 hrs or 24-34 times for 1 hr to graded concentrations (generally exceeding levels in polluted ambient air) of pure gases (sulfur dioxide, nitrogen dioxide, and ozone, and vapors of acrolein and a diepoxide), to mixtures of these, and to artificial smogs. Corneal examinations were made. Results of acute exposure showed that with the exception of the epoxy compounds, the irritants produced no objective evidence of effect on the anterior segment of the eye. On chronic exposure, only SO2, at 6 ppm, produced a positive effect. Panels of 5-10 humans were studied in an exposure chamber with air changes 8-16 times an hour. Degrees of sensory response were recorded by the subjects at one-min intervals for 6 min for eye and nose irritation, pulmonary discomfort, olfactory recognition, and central nervous system signs. Corneal examinations were performed. The greatest degree of irritation came from SO2 at 9.1 ppm, but in general only minimum irritation effects were found. It is concluded that the concentrations of air pollutants likely to be encountered in the ambient air are not sufficient to cause significant biochemical deviation, and that the mechanism for eye irritation is not demonstrable from the evidence now available. Studies of eye irritation by other investigators are briefly reviewed, and the use of selected panels of human subjects under experimental conditions vs. community panels-at-large is discussed.
APTIC-24710

PAINT INDUSTRY SMOG CHAMBER. I. DESIGN AND VALIDATION OF A SMOG CHAMBER.

National Paint, Varnish, and Lacquer Assoc., Inc., Washington, D. C., Technical Div., Circ. 797, 25p., Jan. 1969. 8 refs. (Presented at the Air Pollution Control Association Meeting, Saint Paul, June 1968.)
Francis Scofield, Arthur Levy, and Salo E. Miller.
Identifiers: *Eye irritation, *Smog, *Exposure chambers, Oxidants, Solvents, Operating variables, Measurement methods, Design criteria, Irradiation chambers, Aldehydes, Hexanes, Butenes, Ethylene, Toluenes, Nitric oxide (no), Nitrogen dioxide (no2), Ozone, Photooxidation, Visible radiation.

The design and construction of a smog chamber and the results of initial photochemical smog studies conducted are described. The chamber, built of aluminum and Teflon, is 610 cu ft in volume. One wall of the chamber contains seven eye ports, the other-the illumination side-contains a 90 sq ft area of Teflon. Illumination is provided by a bank of 111 fluorescent lamps, balanced to give a spectral distribution in the region of 2900-8000 A, equivalent to natural sunlight. Light intensity measurements, by potassium ferrioxalate actinometry, are reported. Auxiliary equipment, including the air-purification system, and routine monitoring procedures, are described. Background measurements of irradiated clean air and clear air containing, separately, isobutylene and nitric oxide show that eye irritation from these systems is minimal. Ozone half-life in the chamber is eight hours when dark, and one and one-half hours when illuminated. Procedures for selecting eye panels and for operating the chamber are discussed. Reactions of four baseline hydrocarbons are reported. Chemically, the decreasing order of reactivity is as follows: trans-2-butene, ethylene, toluene, and cyclohexane. Reactivity is discussed in terms of NO photo-oxidation, NO2 and ozone formation, [illegible], and aldehyde formation. [illegible] eye irritation indices are [illegible] with several chemical reactivity parameters; eye-response correlation in terms of molecular structure and aldehyde formation is also presented.
APTIC-24711

HAIR TRACE METAL LEVELS AND ENVIRONMENTAL EXPOSURE.

Preprint, National Air Pollution Control Administration, Durham, N. C., Div. of Health Effects Research and Western Area Occupational Health Lab., Salt Lake City, Utah, 20p., 1970 (?). 33 refs.
D. I. Hammer, J. F. Finklea, R. H. Hendricks, C. M. Shy, and R. J. M. Horton.
Identifiers: *Hair, *Metal compounds, Children, Males, Metal poisoning, Urban areas, Statistical analyses, Arsenic compounds, Cadmium compounds, Copper compounds, Lead compounds, Zinc compounds.

Hair may be a practical dosimeter for metallic pollutants. Hair levels of arsenic and lead have been useful in the diagnosis of clinical poisoning. Hair trace metal levels were related to environmental exposure in a study of 4th grade boys in cities representing exposure dose gradients for arsenic, cadmium and lead, copper, and zinc. Hair samples were carefully and stringently washed before analysis for As by spectrophotometry and for Cd, Cu, Pb and Zn by atomic absorption. Hair trace metal distributions for As, Cd, Cu and Pb were positively skewed while those for Zn were symmetrical. Means were in accord with exposure rankings for As, Cd, and Pb but not for Cu and Zn. When grouped across a ranking gradient, differences among the means for As, Cd and Pb were statistically significant while those of Cu and Zn were not. The present study minimized possible effects of age, sex, hair color, varying hair length and chemical treatments. Despite residual problems of exogenous deposition, endogenous absorption routes, and relationships of hair metal to body burden, mean hair metals levels for As, Cd, and Pb accurately reflected community exposures. (Author abstract modified)
APTIC-24716

ESTIMATION OF SMALL AMOUNTS OF FLUORIDE IN BODY FLUIDS.

Anal. Chem., 31 (12):2092-2094, Dec. 1959. 10 refs.
Harry W. Linde.
Identifiers: *Enzymes, *Inhibition, *Fluorides, *Hydrolysis, Humans, Hematology, Diagnosis, Urinalysis, Body fluids, Esters, Fluorinated hydrocarbons, Ions.

The current use of fluorinated organic compounds in medicine makes it desirable to have a method to determine the possible formation of fluoride ion within the body from these compounds. Submicrogram amounts of fluoride ion may be estimated directly in body fluids or water by measuring their inhibitory effect on the enzymatic hydrolysis of ethyl butyrate. In blood or urine, the sensitivity is about 0.1 gamma per ml and in water about 0.1 gamma per 100 ml. The reproducibility is about 0.1 to 0.2 gamma. The procedure is useful for determining fluoride ion in the presence of compounds containing fluorine in nonlabile organic combination, as it does not require sample ashing, which might decompose these compounds. Substances which interfere with enzyme activity or which are excessively buffered will interfere with the method. (Author abstract modified)
APTIC-24720

BODYPLETHYSMOGRAPHY.

(Ganzkorperplithysmographie). Beitr. Klin. Erforsch. Tuberk. Lungenkr., vol. 140:265-272, 1969. 16 refs. (Presented at the German Association for Tuberculosis and Pulmonary Diseases, 23rd Scholarly Conven[illegible], Baden-Baden, Germany, Oct. 16-19, 1968.) Translated from German. Belov and Associates, Denver, Colo., 10p., July 27, 1970.
D. Nolte.
Identifiers: *Diagnosis, *Pulmonary resistance, *Plethysmography, Humans, Respiratory system, Bronchi, Alveoli, Emphysema, Germany.

In the past, quantitative evaluation of an obstruction in the respiratory passages depended on measuring parameters of pulmonary function, the values of which reflect flow during forced ventilation and are contingent to a great extent on the assistance of the subject. Direct analysis of bronchial flow resistance is now possible by means of a procedure, body plethysmography, which measures synchronous respiratory changes in volume of the lungs as a change in volume of the whole body. Simultaneously, the process measures intrathoracic gas volume (IGV), which is significant in the diagnosis of emphysema. Measurements are made while the patient sits in a narrow, sealed chamber into which warm, moist air is directed. Chamber pressure and intensity of respiratory flow are recorded during a complete respiratory cycle, the measurements yielding a closed pressure or 'hackle' curve that describes the relationship between alveolar pressure and chamber pressure. Resistance and IGV are read on a nomogram. The method makes it possible to determine whether an obstruction in respiratory passages is functional (and thereby reversible) or morphologically fixed.
APTIC-24731

PROPERTIES OF OZONE AS AN INDUSTRIAL POISON.

In: U.S.S.R. Literature on Air Pollution and Related Occupational Diseases, vol. 2:10-16, 1960. 10 refs. Translated from Russian by B. S. Levine. Also: Gigiena i Sanit., 20 (2):28-33, 1955.
S. M. Gorodinskii.
Identifiers: *Maximum allowable concentration, *Occupational health, *Toxicity, *Ozone, Mice, Humans, Toxic tolerances, Ussr.

Preliminary to establishing allowable ozone concentrations, determinations were made of the ozone concentrations likely to be encountered in industrial establishments, of the ozone concentrations toxic to white mice, and of the effects of ozone on workers exposed to highly ozonized air. In investigations involving high-voltage generators, gas spectrographs, and ultraviolet radiation, average industrial ozone concentrations were found to be between 0.001 and 0.003 mg/li and maximum concentrations from 0.008 to 0.009 mg/li. The principle sources of ozone formation were the electrical discharges produced by equipment components subjected to the high-voltage discharges. Experiments with mice established that a two-hr exposure to 0.15 mg/li ozone was fatal and that 0.02 mg/li constituted the maximum tolerance dose on the basis of a two-hr exposure. Animals exposed to 0.005 to 0.01 mg/li developed plothora, porivascular edema, bronchitis, lobar catarrhal pneumonia and showed degenerative changes in the liver. One-hr exposure to 0.003 mg/li ozone caused an initial disturbance in conditioned reflex activity, while repeated one-hr exposures to 0.002 to 0.001 mg/li caused initial disturbance in higher nervous activity. Delayed positive conditioned reflexes and disruption of conditioned internal inhibition were observed after one-hr exposure to 0.004 and 0.005 mg/li ozone and acute disturbances in conditioned reflexes after exposure to 0.008-0.01 mg/li. The experimental

data was confirmed by the polyclinical investigation of exposed workers, and it is recommended that 0.0001 mg/li ozone be adopted as the legal limit of allowable ozone concentration in industrial establishments.
APTIC-24741

INVESTIGATION OF THE RELATION BETWEEN THE HUMIDITY OF RESIDENCES AND CHRONIC ATTACKS OF THE BRONCHI OF MINORS.

(Ondersoekingen over het verband tussen de vochtigheid van wonongen en chronische klachten van de luchtwegen bij minderjarigen). Ned. Tijdschr. Geneesk. (Haarlem), 114 (8), Feb. 21, 1970. Translated from Dutch. Belov and Associates, Denver, Colo., 13p., Oct. 23, 1970.
H. Varekamp, and M. S. Leupen.
Identifiers: *Humidity, *Children, *Bronchitis, Chronic, Age, Bronchi, Health impairment, Asthma, Europe.

It is an established fact that housedust in humid residences contains many more allergens than housedust in dry residences. Consequently, it is reasonable to expect more patients with chronic attacks of the bronchi to live in humid residences than in drier ones. The climate of the Netherlands is not very humid, but because of the extremely wet soil in the country, the residences are often very humid. A system for the estimation of the humidity of residences is described. A survey of people under the age of 21 who had suffered from either asthma or bronchitis indicated that the percentage of chronic attacks increased as the residences became more humid. An investigation of the meaning of humid residences for atopic asthma and eosinophilia is being conducted.
APTIC-24772

STUDIES ON HUMAN AND EXPERIMENTAL LEAD POISONING. THE INHIBITORY MECHANISM OF RED BLOOD CELL ALA-DEHYDRATASE.

(Studi sulla intossicazione umana e sperimentale da piombo. Sul meccanismo inibitorio dell' ala-deidratasi eritrocitaria). Text in Italian. Med. Lavoro (Milan), 59 (6-7):419-424, June-July 1968. 7 refs.
D. Bonsignore, C. Cartasegna, C. Vergnano, and V. Ardoino.
Identifiers: *Lead compounds, *Blood cells, *Metal poisoning, Humans, Enzymes, Inhibition, Italy.

The red blood cell delta-aminolevulinico (ALA)-dehydratase, which is highly reduced in saturnism, can be brought to normal values by heating the haemolysate for 5 min at 60 C. In vitro lead-inhibited enzyme can not be reactivated by heat. Such results point out a great difference between the inhibition of the enzyme in vitro and that found in saturnism. The results are discussed with the aim of interpreting the mechanism of the inhibition of the ALA-dehydratase in lead poisoned patients.
APTIC-24784

A COOPERATIVE STUDY OF CERTAIN MEASUREMENTS OF EMPHYSEMA.

Am. Rev. Respirat. Disease, vol. 98:217-228, Aug. 1968. 2 refs.
W. M. Thurlbeck, A. E. Anderson, M. Janis, R. S. Mitchell, and P. Pratt.
Identifiers: *Diagnosis, *Emphysema, Pathological techniques, Lungs, Canada.

Forty paper-mounted whole lung sections were examined by 9 observers expert in the pathology of emphysema. The participants were instructed to give each lung a score, while a measurement termed the coop score, was derived from the observer scores. There was wide variation in interpretation of the presence or absence of emphysema, the type of emphysema, and the extent and severity of the disease. Each observer used his own system of measurement, and not all observers were familiar with paper-mounted whole lung sections. The major difference was attributed to interobserver variation, particularly of 2 observers who saw large amounts of panlobular emphysema. There was generally a similarity in ordinal ranking. (Author summary modified)
APTIC-24804

ABSORPTION OF NO AND NO2 IN SMALL AND LARGE CONCENTRATIONS THROUGH INHALATION.

(Absorption von NO and NO2 in MIK-und MAK-Konzentrationen bei der Inhalation). Text in German. Staub, Reinhaltung Luft, 30 (9):380-381, Sept. 1970. 6 refs.
Hans-Michael Wagner.
Identifiers: *Respiratory system, *Absorption, *Nitric oxide (no), *Nitrogen dioxide (no2), Humans, Respiration, Breathing, Germany.

The absorption of low concentrations of nitric oxides (nitric oxide and nitrogen dioxide) in the human respiratory tract is investigated. The absorption behavior of both irritant gases does not differ in any essential way: in the case of normal respiration, the absorption is in both cases above 80%, while in the case of maximum respiration, more than 90% of the nitric oxide is retained in the respiratory tract.
APTIC-24820

POSSIBILITY OF THE ANALYTICAL DETERMINATION OF DOSE-THRESHOLD VALUE RELATIONSHIPS.

(Moeglichkeiten fuer die rechnerische Ermittlung von Dosis-Schwellenwertbeziehungen). Text in German. Staub, Reinhaltung Luft, 30 (9):372-375, Sept. 1970. 4 refs.
Bernhard Prinz, and Heinrich Stratmann.
Identifiers: *Thresholds, *Statistical analyses, Humans, Germany, Stack gases, Research methodologies, Sulfur dioxide.

Three methods for the evaluation of the dose-threshold relationship are described and discussed. In the case of the so-called time-interval method, the evaluation is started from a frequency distribution of mean values of concentration; with the so-called concentration-interval method, the determination of 'duration times' within fixed concentration intervals is presumed. With the parameter method, the type of distribution and its parameters must be known to set up a continuous relationship between dose and corresponding thresholds. Advantages and disadvantages of the methods mentioned here are discussed by means of numerical examples. Threshold and dose values of sulfur dioxide are given in mg/cu m.
APTIC-24832

THE HYGIENIC ASPECTS OF THE PRODUCTION AND USE OF LEAD ANTIKNOCK COMPOUNDS.

J. Air Pollution Control Assoc., 13 (7):314-321, July 1963. 28 refs. (Presented at the air Pollution Control Association, 55th Annual Meeting, Chicago, May 20-24, 1962.)
Robert A. Kehoe.
Identifiers: *Lead compounds, *Absorption, *Fuel additives, Humans, Occupational health, Non-urban areas, Urban areas, Automotive emissions, Stack gases, Fuels, Industrial emission sources, Chemical processing, Transportation, Air quality measurements, Tetraethyl lead.

The maximum quantities of lead absorbed into the body from that taken into the alimentary and respiratory tracts of the average man may be determined with approximate accuracy on the experimental evidence which shows that somewhat less than 10% of that ingested, and somewhat less than 50% of that inhaled, are absorbed. Absorption and excretion of lead under normal and abnormal conditions of exposure are discussed. In Cincinnati, lead concentrations range from 1 microgram to somewhat more than 6 micrograms/cu meter of air, increasing as one goes from rural zones to suburban areas, and to business and industrial areas. Processes involved in the manufacture of tetraethyl lead and certain analogous lead alkyls may result in the discharge of particulate inorganic lead compounds, as well as the vapors of the organic lead compounds, from vents and stacks into the atmosphere. Concentrated antiknock compounds are transported by rail, in ships, and to a limited extent, in road trucks, in special containers designed to withstand mechanical damage and to minimize the possibility of leakage en route. Pollution of the ambient atmosphere of urban areas with lead alkyls derived from the commercial distribution and use of leaded gasoline as motor fuel is also discussed.
APTIC-24876

LEAD AND AIR POLLUTION: AN ANALYSIS OF THE MORSE REPORT.

For primary bibliographic entry see Field 01.
APTIC-24877

NASOPHARYNGEAL CARCINOMA AND ENVIRONMENTAL CARCINOGENS.

Unio Intern. Contra Cancrum, vol. 1:124-129, 1967.
J. W. Fresh, J. W. Rampsch, and S. C. Sun.
Identifiers: *Nasopharyngeal carcinoma, *Epidemiology, Humans, Tobacco, Smoking, Cancer, Carcinogens, Metal poisoning, Asia, Dusts, Fuels, Domestic heating, Arsenic compounds, Nickel compounds.

Because nasopharyngeal carcinoma is the most common neoplasm in men on Taiwan and is also frequent in women, attempts were made to establish environmental levels of some known carcinogens and also the levels in the hair and fingernails of 83 nasopharyngeal carcinoma patients. High nickel values in tobacco, domestic fuels, hair, fingernails, and house dust suggested an abundance of this metal in the environment. Finely divided nickel powder combines with carbon monoxide to form volatile nickel carbonyl, which is undoubtedly a common atmospheric contaminant in the patients' homes. The arsenic content of hair and fingernails of 87% of the patients was also higher than normal. Thus sufficient carcinogen is present in the atmosphere to produce chronic exposure and accelerate the production of nasopharyngeal carcinoma in Chinese, who have a marked disposition for this form of cancer.
APTIC-24880

SOLUBILITY OF 02 AND CO IN BLOOD AND PULMONARY AND PLACENTAL TISSUE.

J. Appl. Phys., 24 (4):468-474, April 1968. 15 refs.
NTIS, DDC: AD 672872
Gordon G. Power, and Wendell C. Bradford.
Identifiers: *Carbon monoxide, *Oxygen, *Solubility, *Blood gas analysis, Membranes, Tissues, Diffusion.

The Bunsen solubility coefficients, in ml/ml times atm, of oxygen and carbon monoxide in water, saline, whole blood, and homogenates of human pulmonary and sheep placental tissue, were determined at 37 C. The method was to equilibrate a sample of 02 and CO in a swirl tonometer and then to extract and measure the dissolved gases manometrically. Values for the coefficients of 02, CO, and the 02/CO ratio are given. Results suggest that CO diffuses more rapidly through blood and pulmonary and placental tissue than would be predicted from comparative solubilities of 02 and CO in water. However, differences in tissue solubility were not great enough to explain the larger discrepancies in membrane diffusing capacities for the two gases that have been reported previously for the human lung and sheep placenta. The water content in tissue samples could dissolve all the 02 and 94% of the CO that was present. In blood, at least 17% of the 02 in solution and 20% of the CO was loosely bound to constituents other than water. (Author abstract modified)

APTIC-24892

TOBACCO AND THE NONSMOKER. A STUDY OF SUBJECTIVE SYMPTOMS.

Arch. Environ. Health, vol. 16:443-446, March 1968. 7 refs.
Frederic Speer.
Identifiers: *Smoking, *Allegies, *Smokes, Humans, Tobacco, Epidemiology, Skin tests, Allergies, Eye irritation, Headache, Respiratory, Cough.

A survey of both allergic and nonallergic nonsmokers revealed that intolerance to tobacco smoke is common in both groups. The most common complaints are nasal symptoms, conjunctival irritation, headache, and cough. The effect of tobacco smoke appeared to be of an irritative rather than an allergic character. This conclusion is based on the following findings: (1) similar reactions occurred in allergic and nonallergic individuals; (2) skin tests were positive in only about one allergic patient in six; and (3) allergic manifestations which are unrelated to irritation, like urticaria and exzema, were absent in all cases. The undue sensitivity of some individuals to tobacco smoke can be described by the term 'idiosyncrasy'. In other words, anyone will be affected by the heavy pollution of a smoke-filled room; but only the patient with idiosyncrasy to tobacco smoke will develop symptoms from exposure to the amount which he encounters in ordinary life activities. (Author summary modified)
APTIC-24893

ASSOCIATED HEALTH IMPLICATIONS IN AIR-POLLUTION CONTROL.

In: Problems and Control of Air Pollution. F. S. Mallette (ed.), New York, Reinhold, 1955, Chapt. 8, p. 69-73. 6 refs.
E. A. Watkinson.
Identifiers: *Air pollution episodes, *Epidemiology, Research programs, Chronic, Humans, Synergism, Canada, Detroit, Urban areas, Smog, Adsorption.

It is suggested that a distinction be made between the Meuse Valley, Donora, and Poza Rica air pollution episodes, and the London 1952 incident which was more typical of the relatively featureless' type of pollution found in major cities. Properly defined studies are needed to obtain definitive correlations, if any, between low pollution levels and resulting chronic effects. A study of this type in progress in the Windsor-Detroit area is described, encompassing an environmental sampling program and a health study in which the sickness experienced by members of households in areas of different average pollution levels is recorded. Other approaches require investigation as well. Among the hypothesis advanced to explain the unaccountably high irritant and toxic properties of urban smogs are those of synergism, adsorption, and solubility, but basic experimental data on these mechanisms is still lacking.
APTIC-24910

SUMMARIES OF LITERATURE RELATED TO AIR POLLUTION.

(Taiki osen kankeibunken shoroku shu). Text in Japanese. Japan Society of Public Health, Tokyo, Public Nuisance Control Research Committee, 86p., 1966 (*).
Personal Author Not Recorded.
Identifiers: *Settling particles, *Automotive emissions, *Epidemiology, Mortality, Occupational health, Pathological techniques, Respiratory functions, Allergies, Lung cancer, Asthma, Bronchitis, Emphysema, Japan, Engine exhausts, Aerosols, Dusts, Soot, Smog, Smokes, Sulfur dioxide.

The collection of the literature concerning the effect of air pollution on the human body includes the writings and reports published in 1964 and 1965. The literature covered was 55 medical journals, two academic conference reports and two administrative reports. Of the 39 items covered, 29 concerned epidemiological investigations, six on pathological examinations, and four on exposure experiments as well as experimental methods. The topics include the effects of smoke and soot, variation of death rate due to smog, the effects of automobile exhausts on people with occupations related to traffic, the effects of air pollution on human respiratory functions, epidemiological studies of air pollution, and the relationship between air pollution and chronic bronchitis, emphysema, and allergies. In addition there are articles on the public nuisances in Yokkaichi, Tokyo, and Kawasaki, studies on Yokkaichi asthma, air pollution and lung cancer, pathological studies of air pollution in the Hiroshima area, the relationship between the trapped dust particles in a dog's lungs and air pollution, and medical studies of aerosols.
APTIC-24918

STUDIES OF THE MODE OF ACTION OF ASBESTOS AS A CARCINOGEN.

S. African Med. J. (Johannesburg), vol. 41:800-804, 1967. 34 refs.
J. S. Harrington, F. J. C. Roe, and M. Walters.
Identifiers: *Carcinogens, *Asbestos, *Reaction mechanisms, Tumors, Africa, Great britain, Metal compounds, Radioactive radiation.

Because of the complex chemical and physical nature of asbestos, several different mechanisms may be involved in asbestos carcinogenesis. The asbestos fiber in the pure state (i.e., not contaminated with organic fiber or trace metals) may act as the carcinogen, possibly as a macromolecular iron or metal complex, in an anallgous way to iron-dextran. Asbestos fibers in the contaminated state may act in conjunction with (a) oils and other organic matter, (b) trace metals known to be carcinogenic, (c) with both of these, or (d) with any radioactivity produced by the fibers. Oils (natural and contaminating) in at least one large batch of crocidolite and one of amosite possess tumor-initiating activity. In this case, the fiber may act as a promoting agent or as a carrier for carcinogens. Jute oil, which is absorbed to a considerable extent by asbestos during storage, had a marked tumor-promoting activity; this could act in conjunction with any intrinsic initiating activity possessed by the pure fiber or present in the natural oil. Carcinogenic trace metals present in asbestos (in particular chrysotile) may contribute to the final carcinogenic effect of this type of asbestos, although it seems unlikely that they could account for the entire carcinogenic effect. The values obtained for the radioactive content of crocidolite, amosite, and chrysotile are so low that it seems clear that radioactivity plays no more than a very minor role in the induction of cancer by asbestos. (Author determination modified)
APTIC-24925

WIDENING SPECTRUM OF ASBESTOS DISEASE.

Preprint, American Assoc. for the Advancement of Science, Washington, D. C. Committee on Science in the Promotion of Human Welfare and the Scientists Inst. for Public Information, New York, 19p., 1968. 9 refs. (Presented at the Symposium on Unanticipated Environmental Hazards Resulting from Technological Intrusions, Dallas, Tex., Dec. 28, 1968.)
I. J. Selikoff.
Identifiers: *Cancer, *Asbestosis, *Asbestos, Humans, Epidemiology, Health statistics, Mortality, Occupational health, Lung cancer, Statistical analyses.

Mortality statistics for insulation workers in the New York area demonstrate that exposure to even limited quantities of asbestos can be disastrous. Among 632 insulation workers alive in 1942, there should have been 203 deaths by 1962. Instead, there were 255, an excess of 50%. Where six or seven deaths due to cancer of the lung or pleura were predicted, there were 45. Where nine or 10 deaths due to cancer of the stomach or colon were predicted, there were 29. Asbestosis claimed 12 lives against none expected. Similar calculations to 1967 gave similar results: 27 deaths due to cancer and 15 to asbestosis. The possibility also exists that utilization of asbestos might be associated with a risk to the community at large. In an asbestos-rich area of Cape Province, South Africa, 45 cases of mesothelioma appeared due to environmental exposure, not occupational exposure. Similarly, 26% of 500 consecutive autopsies performed in Capetown showed the presence of 'asbestos bodies' in the lungs of people who were not asbestos workers. In Finland, 499 cases of 'asbestotic' pleural calcification were found among individuals who lived near but did not work at an asbestos mine.
APTIC-24934

THE DEATH RATE DUE TO LUNG CANCER IN PEOPLE LIVING IN SELECTED TOWNS IN POLAND IN THE POLLUTION OF THE ATMOSPHERE.

(Umieralnosc na raka puc mieszkancow wybranych miast polskich a zanieczyszcenia powietrza atmosferycznego). Roczniki Panstwowego Zakladu Higi., 20 (5):515-526, 1969. 25 refs. Translated from Polish. Belov and Associates, Denver, Colo., 16p., July 29, 1970.
Jan Just, Stefan Maziarka, and Maria Deugasiewicz.
Identifiers: *Poland, *Lung cancer, *Urban areas, *Polynuclear compounds, Humans, Morbidity, Mortality, Bronchial cancer, Europe, Dusts, Air quality measurements, Statistical analyses, Aromatic hydrocarbons.

A correlation between atmospheric pollution and the morbidity and mortality from respiratory tract cancer in ten Polish towns was investigated. The statistical analysis did not reveal any correlation between the total amount of atmospheric dust and the death rate from cancer of the lungs and the bronchi. Some correlation existed between the degree of pollution of the air in the investigated cities by aromatic polycyclic hydrocarbons and the death rate from cancer of the lungs and the bronchi. Among the tested towns, the highest level of these hydrocarbons was in the atmosphere in Zabrze, Katowice, and Gdansk; in all these cities, the death rate from cancer of the lungs and the bronchi was the highest. Warsaw had the lowest level of aromatic polycyclic hydrocarbons in the atmosphere among all investigated towns. Simultaneously, Warsaw had also one of the lowest death rates from cancer of the lungs and the bronchi.
APTIC-24935

EFFECTS ON CANINE PULMONARY FUNCTION VIA INDUCED NO2 IMPAIRMENT, PARTICULATE INTERACTION, AND SUBSEQUENT SOX.

Arch. Environ. Health, vol. 18:596-601, April 1969. 21 refs. (Presented at the American Medical Association Air Pollution Medical Research Conference, 9th, Denver, Colo., July 23, 1968.)
Trent R. Lewis, Kirby I. Campbell, and Thomas R. Vaughan Jr.
Identifiers: *Pulmonary function, *Nitrogen dioxide (no2), *Sulfur dioxide, Chronic, Dogs, Respiratory functions, Compliance, Pulmonary resistance, Particulates, Sulfuric acid, Iron oxides, Sulfur oxides.

Experiments were performed to determine the pulmonary effects of sequential exposure to more than one pollutant and of nitrogen dioxide in the presence of particulates. Two chronic inhalation regimes were employed: dogs were (1) exposed to NO2 at 26 ppm for 191 days, followed by a 225-day exposure to 5 ppm SO2 or 0.8 mg/cu mm hydrogen sulfur (H2SO4), or both; and (2) exposed to NO2 plus iron oxide (Fe2O3) particulate (26 ppm and 0.9 mg/cu mm, respectively) for seven months. The following pulmonary function tests were performed: pulmonary single-breath carbon monoxide (CO) diffusing capacity (DL), pulmonary compliance (CL), and total pulmonary resistance (RL).

The NO_2-oxides of sulfur yielded statistically significant results for DL, CL, and RL. Dogs receiving H_2SO_4 had a lower DL than the dogs in the other four treatment groups that did not receive H_2SO_4, P less than 0.01. Dogs receiving SO_2 had a lower CL and higher RL than dogs in the other four treatment groups that did not receive SO_2, P less than 0.05 and P less than 0.01, respectively. Dogs that were not exposed to NO_2 but were exposed to subsequent SO_2 plus H_2SO_4 had a smaller 'residual volume' than the dogs in the other seven treatment groups, P less than 0.01. Exposure of dogs to NO_2 plus Fe_2O_3 particulate resulted in an increase in RL from the control value of 1.6 to 4.0 cm H_2O/li/sec, P less than 0.05. Some of the data imply that a lung previously remodeled by toxicant is more difficult to alter physiologically than one which has never been exposed to toxic concentrations of pollutants. (Author summary modified)
APTIC-24940

OVARIAN CANCER AND ASBESTOS.

Environ. Res., 1 (2):115-128, Feb. 1967. 13 refs.
John Graham, and Ruth Graham.
Identifiers: *Ovarian cancer, *Asbestos, Guinea pigs, Hamsters, Mice, Rabbits, Females, Pathological techniques, Diagnosis, Cells, Epithelium, Cancer.

While ovarian cancer is uncommon in less developed areas, there is a rising death rate from ovarian cancer in advanced western countries. In New York City alone, the death rate from this cause in women 25 years of age or more has increased from 8.7 in 1931 to 20.2 in 1964. A group of pre-clinical cases were found by exposing the posterior vaginal fornix with a speculum, passing a needle into the pouch of Douglas, and aspirating fluid. Histological patterns found in a series of 22 cases with negative physical findings and positive cul-de-sac aspirations are all indicative of increased mitotic activity. The surface epithelium of the ovary is composed of a single layer of cuboidal cells, and if there is increased cell division in this single-layered epithelium, three changes may occur. First, and most common, is the formation of the papillary processes, while a second change that occurs as the result of increased cellular division is the formation of an abnormal multilayered epithelium. The third change seen in these ovaries is invasion of the underlying stroma by proliferation of the surface cells which classifies it as cancer. Some mesotheliomas closely resemble ovarian carcinoma histologically, and reviewing post-mortem data, Keal found four lung cancers and nine abdominal cancers in 15 women with asbestosis. Four species of animals were injected with asbestos intraperitoneally and observed for its possible effect on the ovary. The lack of any change in nineteen hamsters and in eighteen mice may be explained by the fact that in the mouse and hamster the ovary is surrounded by a veil of peritoneum which makes it inaccessible to injected material. The ovarian surface of two rabbits was converted from a single layer of cuboidal epithelium to an extensive papillary process of cells with abnormal nuclear configuration, while the surface changes in the ovaries of two guinea pigs were a transformation of the single layer epithelium to a multilayered one with extremely abnormal cells and mitotic activity. When stained histologic sections were studied with polarized light, six of twelve patients with early ovarian malignant changes showed foci composed of histiocytes and foreign body giant cells about intact crystals.
APTIC-24942

OZONE AND LIPID PEROXIDATION.

Arch. Environ. Health, vol. 18: 631-635, April 1969. 43 refs. (Presented at the Air Pollution Medical Research Conference, American Medical Association, Denver, Colo., July 24, 1968.)
Bernard D. Goldstein, Charlotte Lodi, Charlotte Collinson, and Oscar J. Balchum.
Identifiers: *Lipids, *Ozone, *Oxidation, Mice, Age, Cells, Enzymes, Membranes, Lungs, Toxicity, Aldehydes, Sulfhydryl compounds, Sulfur compounds, Chemical bonds, Free radicals, Reaction mechanisms.

There is a substantial body of evidence implicating free radicals as a basic biochemical mechanism of ozone induced cell damage. Based on the well-known ability of ozone to react with the double bonds of unsaturated fatty acids (UFA), it was recently suggested that the attendant UFA breakdown would lead to the formation of free radicals and other intermediates capable of causing cellular injury. Similar reactions with the carbon-carbon double bond of UFA can also be instigated by free radicals or by oxygen in an entity known as lipid peroxidation. Studies of the kinetics of the reaction between ozone and the erythrocyte enzyme acetylcholinesterase, and between ozone and intracellular sulfhydryl levels, revealed that not only did depression of AChE precede -SH oxidation, but also that the AChE effect was completely independent in that experimental manipulation of intracellular -SH levels did not change the rate of AChE depression. Evidence to support the hypothesis that lipid peroxidation is involved in the mechanism of ozone produced cell membrane damage in the in vitro erythrocyte system was obtained in a number of ways. In another study, electron paramagnetic resonance technique was utilized to demonstrate free radical signals produced during the ozonization of linoleic acid, a biologically common UFA. Inbred laboratory mice were exposed to 0.4 to 0.7 ppm ozone for four hours, and spectrophotometric analysis of the extracted lipid in methanol revealed an ultraviolet absorption pattern denoting the presence of diene and triene bonds which has been considered characteristic of lipid peroxidation. The protection provided by sulfur containing compounds may be due to their free radical scavenging properties preventing the propagation of the free radicals derived from lipid peroxidation, and thereby protecting other more integral sites from destruction. Breakdown products of oxidized lipid include substances capable of causing condensation, polymerization, and cross linking of protein, and may perhaps be the origin of the aldehydes reported in lung tissue after ozone exposure. Lipid peroxidation has been implicated as a mechanism of biological damage in carbon tetrachloride hepato-toxicity, hyperbaric oxygen toxicity, ethanolic liver disease, radiaton toxicity, and various vitamin E deficiency states. Harman was among the first to suggest that lipid peroxidation is involved in aging.
APTIC-24953

REVIEW OF TENTATIVE ABORT, ALERT, 100 AND 1000-DAY LIMITS FOR SPACE CABIN CONTAMINANTS.

For primary bibliographic entry see Field 11.
APTIC-24957

PSYCHOPHARMACOLOGY OF CARBON MONOXIDE UNDER AMBIENT AND ALTITUDE CONDITIONS.

Proc. Conf. Atmos. Contamination Confined Spaces, 4th Annu., Wright-Patterson AFB, Ohio, 1968, p. 81-91. 3 refs. (Sept. 10-12; Paper 7, discussion included.) CFSTI, DDC: AD-855 001
Kenneth C. Back, and Abel M. Dominguez.
Identifiers: *Carboxyhemoglobin, *Nervous system, *Spacecraft atmospheres, Primates, Exposure methods.

Experiments were designed to study the effects of carbon monoxide on the central nervous system in terms of the biochemistry involved at the cellular and subcellular levels, the effects on the electrical activity in the brain, and the total effects on performance. Since there have been reports that CO exposures to levels around the threshold limit value of 50 ppm have caused performance decrements in human subjects, these specific experiments were designed to correlate performance with carboxyhemoglobin levels of exposed animals. The subjects were 12 adult Macaca mulatta monkeys, which were placed in individual working cages especially designed to fit in front of each of 12 windows within one Thomas dome. In order to test performance changes, two continuous 100-day CO exposure studies to 55 mg/cu m in ambient air, and in a space cabin atmosphere of 5 psia total pressure, mixed gas environment consisting of 68% oxygen and 32% nitrogen were performed. At the end of the second experiment, and without stopping exposures, CO concentrations were increased to 110, 220, and 440 mg/cu m, respectively, at 7-day intervals. In the two experiments conducted at 55 mg/cu m, carboxyhemoglobin % saturation plateaued after the first 48 hours' exposure at 3.7 and 4.7, respectively. There was no observable decrement in performance under either ambient or altitude conditions, nor were there changes in other clinical parameters. Exposure to 110, 220, and 440 mg/cu m caused mean carboxyhemoglobin saturations of 8.3, 19.5 and 30.1%, respectively. These levels produced performance changes in two of the 12 monkeys; the 440 mg/cu m level also produced changes in appetite and in outward appearance in 6 of the 12 animals. (Author summary modified)
APTIC-24958

MOTOR FUMES AND ATMOSPHERIC POLLUTION.

Chem. Ind. (London), 51 (29):605-607, July 15, 1932. 23 refs.
C. J. Regan.
Identifiers: *Toxicity, *Engine exhausts, *Lead compounds, *Carbon monoxide, Carboxyhemoglobin, Thresholds, Metal poisoning, Great britain.

The most important constituent of exhaust gas as regards atmospheric pollution is carbon monoxide, which varies from 1 to 12% and averages about 5%. Six hours inhalation 'at rest' to air containing 20 parts CO per 100,000 can lead to 15-20% of CO-hemoglobin (i.e., 60-70% of the maximum possible value for this concentration). Exercise would reduce the period required to produce this state to four hours or less. However, air in towns and congested areas rarely contains more than 20 parts CO per 100,000 so there is no chance of acute CO poisoning of ordinary street users. There is some danger in the case of persons controlling congested traffic intersections for long periods: traffic policemen have shown values up to 30% CO saturation of hemoglobin at the end of turns of duty. An attitude of caution is also advisable with regard to the amount of lead emitted by automobiles. The amount inhaled may not reach the maximum (2 mg per day) required for chronic lead poisoning, but lead is a cumulative poison and the possibility exists that smaller amounts may be a danger to the human system.
APTIC-24961

EFFECTS OF AIR POLLUTION ON ANIMALS EXPOSED TO STREET ATMOSPHERES IN DETROIT.

Proc. Conf. Atmos. Contamination Confined Spaces, 4th Annu., Wright-Patterson AFB, Ohio, 1968, p. 25-37. (Sept. 10-12; Paper 3, discussion included.) CFSTI, DDC: AD-855 001
Ralph G. Smith.
Identifiers: *Laboratory animals, *Detroit, *Streets, *Pollutants, Blood chemistry, Emphysema, Particulates, Exposure methods.

A study was undertaken to determine whether health effects, or indeed any effects, attributable to ordinary levels of air pollution could be detected by an investigation involving laboratory animals. The exposure facility was maintained for approximately four years, and the animals breathed air from Detroit's streets 24 hours a day throughout this period. It did appear that some of the exposed animals contained increased quantities of several metals, but statistically the small number of samples and the large variability combined to make the observed differences of low significance. The rates at which the animals died

were practically identical, indicating no air pollution effect. No evidence of reduced weight gain attributable to air pollution was apparent in either sex. Physiological testing during the study involved electrocardiography, measurements of pulmonary function, cardiac function, and body temperature, but none of these parameters showed any valid differences. Biochemical tests produced similar results, while histopathological studies indicated that emphysema occurred more frequently among the exposed rats. The white blood count was nearly always higher in the exposed colony, possibly representing an increased phagocytosis in response to a higher particulate loading in the respiratory tract.
APTIC-24964

THE CURRENT STATUS OF CANCER RESEARCH.

(Der gegenwaertige Stand der Krebsforschung). Text in German. Krebsarzt, 23 (6):839, June 1968. 4 refs. (Presented at the Yearly Meeting of the Austrian Cancer Society, Vienna (Austria), Feb. 29, 1968.)
H. Wrba.
Identifiers: *Cancer, *Research methodologies, Humans, Epidemiology, Genetics, Immunology, Antigens, Drugs, Cells, Europe.

Cancer is not caused by a single agent but by a sum of noxae. Also, ordinary viruses can contribute to the genesis of cancer which explains the disappointing results of chemotherapy: a process continuing for a period of years cannot be reversed by a simple specific drug. The idea has been advanced that it should be possible to achieve a renormalization of a cancerous cell by the substitution of products which the gen normally passes on to the cell; even though there is some experimental evidence supporting this contention, this approach is still a speculative one. In the area of immunology, proof has been rendered that tumors contain specific antigens. Cancerous cells are characterized as such but each cancer has its own specific antigen, there is no universal antigen for all cancers. The theoretical possibility exists to develop a vaccine against cancer. As of now no definite relationship has been established between a virus and human cancer and no serum has been developed.
APTIC-24971

ASSESSING THE DEGREE OF EXPOSURE TO DUST AND OCCUPATIONAL EPIDEMIOLOGY.

(Rangmaessige Schaetzung der Staubexposition und arbeitsmedizinische Epidemiologie). Text in German. Staub, Reinhaltung Luft, 30 (10):419-422, Oct. 1970. 7 refs.
Hans-Joachim Woitowitz, Gustav Schaecke, and Rotraud Woitowitz.
Identifiers: *Epidemiology, *Occupational health, *Dusts, Personnel, Maximum allowable concentration, Humans, Diagnosis, Lungs, Anthracosis, Asbestosis, Byssinosis, Silicosis, Asbestos, Germany, Mineral processing.

A method assessing the degree of exposure to dust is described which works on the assumption of the validity of the dust quantity- harmful effect relationship and which permits the classification of dust exposure hazards in specific industries. The degree of dust exposure is quantified in the form of the product of danger years (number of working years) and danger class determined experimentally by a correlation of dust quantities and effect on health in specific industries. Thus asbestos plant employees are assigned to 7 different danger classes from administrative personnel classified as D O (danger) to employees working on asbestos sheet calenders classified as D 1.5 to employees working on asbestos crushing mills classified as D 3. The thus quantified degree of exposure can be used for the determination of maximally admissible emission levels (taking into account a 30-year working life), for the determination of optimal intervals between medical checkups, for epidemiological purposes, and for purposes of effective prophylaxis.
APTIC-25543

AIR POLLUTION AND HEALTH.

(Luftverunreinigung und Gesundheit). Text in German. Z. Praeventivmed., vol. 15:217-230, 1970. 22 refs.
A. Gilgen.
Identifiers: *Diseases and disorders, Socio-economic factors, Chronic, Humans, Morbidity, Mortality, Pulmonary function, Smoking, Lung cancer, Bronchitis, Europe, Urban areas.

It is generally known that in evaluating air pollution as a health hazard to a population group, the smoking habit must be considered. More recent is the discovery that socioeconomic factors play an important role in such studies. The correlation between lung cancer and air pollution must be examined more critically. The effect of pollution on other types of cancer has also gained in importance. The existence of a close correlation between mortality and morbidity of chronic bronchitis and air pollution has been proven. Meteorological factors have an equal impact on the severity of the disease symptoms in chronic bronchitis as the level of pollution. Life in a polluted environment leads to abnormal lung function before the appearance of pathological symptoms. Studies are needed to determine the effect of normal urban pollution on the subjective well-being of city dwellers. Many correlations between pollution and health are hitherto obscure, but enough is known to warrant the energetic introduction of measures for the reduction of pollution.
APTIC-25556

HUMAN COSTS OF POLLUTED AIR.

Med. Times (Port Wash., N. Y.), 98 (9):156-170, Sept. 1970. 31 refs.
Kaye H. Kilburn.
Identifiers: *Humans, *Bronchitis, Acute, Chronic, Mortality, Cells, Respiratory system, Epithelium, Smoking, Health impairment.

Polluted ambient air is considered in terms of five levels of health effects: production of premature death; induction of chronic disease; increased prevalence of minor illnesses or reduced performance; and psychological or nuisance effects. A concept with a high probability of being important as air pollution levels rise is that, at all five levels, pollutants act on the airways to produce acute, recurrent, or chronic bronchitis. Therefore, the effects of specific materials on the primary target cells of the airway epithelium are described. Much work remains to elucidate the mechanism of chronic bronchitis, and to specify which materials should be removed from the atmosphere and what combinations of gases and particulates are worse for humans.
APTIC-25561

CARBON MONOXIDE PARTIAL PRESSURE IN TISSUE OF DIFFERENT ANIMALS.

Environ. Res., 3 (4):303-309, 1970. 8 refs.
M. Goethert, F. Lutz, and G. Malorny.
Identifiers: *Partial pressure, *Carbon monoxide, *Tissues, Laboratory animals, Guinea pigs, Rabbits, Rats, Carboxyhemoglobin, Hemoglobin interactions, Germany, Oxygen.

A pneumoperitoneum of nitrogen was set to rabbits, guinea pigs, and rats; carbon monoxide partial pressure was measured in the tissue of the animals as they breathed air containing 96, 300, 700, and 1000 ppm CO. After diffusion equilibrium was reached, the following results were observed: CO partial pressure in tissues was only 42-69% of the CO partial pressure in inspired air; the percentage CO partial pressure in tissues compared to CO partial pressure in inspired air decreased with increasing CO content of inspired air; and CO partial pressure in tissues decreased with increasing CO affinity of hemoglobin. These results can be explained by the competition of CO and oxygen for the receptor hemoglobin. The CO partial pressure in tissues is influenced decisively by the different CO and O_2 affinities of hemoglobin. (Author abstract modified)
APTIC-25562

EFFECTS OF AIR POLLUTION ON SCHOOL ABSENCES AND DIFFERENCES IN LUNG FUNCTION IN FIRST AND SECOND GRADERS IN BERLIN, NEW HAMPSHIRE, JANUARY 1966 TO JUNE 1967.

Am. Rev. Respirat. Disease, 102 (4): 591-606, 1970. 7 refs.
Benjamin G. Ferris.
Identifiers: *Children, *Absenteeism, *Pulmonary function, Odors, Particulates, Kraft pulping, Air quality measurements, Dust fall, Sulfur dioxide.

Absences from the first and second grades of seven elementary schools (four parochial and three public) in Berlin, New Hampshire, were studied from January to June 1966 (716 students) and from September to June 1967 (692 students). Air pollution measurements were made during most of these periods. School absences were not significantly different between schools, despite considerable differences in levels of pollution. No cases of chronic respiratory disease, general chronic disease, or disability conditions were recorded among the students, nor was there any apparent correlation between gastrointestinal symptoms and odors from a kraft pulp mill. On the other hand, the results of pulmonary function tests indicated changes that could be due to air pollution. Children who attended (and lived near) a school in an area of relatively high sulfur dioxide and particulate concentrations tended to have lower pulmonary function. Another school was in an area with the highest average SO_2 concentration but not the highest dust fall. Since children at this school did not have the lowest pulmonary function, it is suggested that particulates, as indicated by dust fall is as important as the SO_2 concentrations. (Author abstract modified)
APTIC-25563

ANIMAL EXPERIMENT INVESTIGATIONS OF CHRONIC CARBON DISULFIDE POISONING.

(Tierexperimentelle Untersuchungen bei chronischer Schwefelkohlenstoffvergiftung). Text in German. Z. Ges. Hyg. (Berlin), 16 (10):748-750, Oct. 1970. 7 refs.
H. Minden, and R. Rothe.
Identifiers: *Toxicity, *Carbon disulfide, Laboratory animals, Blood cells, Liver, Enzymes, Nervous system, Metabolism, Germany.

The chronic carbon disulfide intoxication in the animal experiment is characterized by a metabolic disturbance which is associated with an enrichment of lactic acid and neutral fat in the liver, leading to a strongly increased alpha-globulin content of the blood serum. Under these circumstances, the relative liver weight increases. There are disturbances of differing extent with the enzymatic reactions of phosphate splitting and transphosphorylation; in connection with the disturbances in the central nervous system which have been also histologically proved, the inhibition of monoamino oxydase, alcohol dehydrogenase, and acetaldehyde oxydase is of importance. The iodine acid test is suited for judging the intake of carbon disulfide.
APTIC-25567

SPIROGRAM AND WASH-OUT CURVE: DO THESE METHODS DISCRIMINATE BETWEEN THE EFFECTS OF DUST INHALATION AND SMOKING UPON LUNG VENTILATION.

Proc. Intern. Congr. Occupational Health, 15th, Vienna, 1966, p. 623-627. 3 refs. (Sept. 19-24.)
P. E. Joosting, and B. F. Visser.
Identifiers: *Ventilation (pulmonary), *Smoking, *Dusts, Adults, Age.

Helium (wash out) curves, based on the multiple breath technique, were obtained for 1003 persons between 15 and 65 years of age, as were cumula-

tive vital capacity (FEV%) curves for forced expiratory volume. Among young persons, deterioration of the helium curve was associated with smoking and independent of dust exposure. Among older persons, deterioration of the curve reflected the combined effect of long-term smoking and dust exposure. While deterioration of the FEV% among persons 35-50 years of age was predominantly a symptom of aging, smoking appeared to lay the basis for the supplementary effects due to dust inhalation. Smoking habits thus determine to a large extent the effects of dust exposure on lung ventilation.
APTIC-25576

CARBON MONOXIDE LEVELS IN ACUTE MYOCARDIAL INFARCTION.

In: Project Clean Air. Los Angeles County
Southern California Univ. Medical Center,
California Univ. Res. Proj. S-22, 10p., Sept. 1,
1970. 6 refs.
L. Julian Haywood, Clifford B. Walberg, Finley
Kerr, Mohammad Mohsenin, and John Mohler.
Identifiers: *Myocardial infarction, *Carbon monoxide, Acute, Humans, Hematology, Carboxyhemoglobin, Smoking, Anemia, Cardiovascular diseases, Spectrophotometry.

Preliminary analysis of the carbon monoxide levels for 34 patients with myocardial infarction and 35 control patients revealed levels of 5.14 plus or minus 7.3 and 4.18 plus or minus 7.3, respectively; 24 of 34 and 8 of the 35 patients were smokers. Further inspection of the data indicated that the conditions of anemia and jaundice in both infarction and control patients were associated with very high values of carbon monoxide. Accordingly, a procedure was set up to test the influence of hemoglobin levels on tests for CO by the spectrophotometric method. Spuriously high CO levels are obtained whenever the hemoglobin level is below 9.0 Gms%. In addition, bilirubin interferes with CO determinations because the reading bands are similar. The comparison of spectrophotometric versus Van Slyke readings in the patients as a whole indicates good agreement at low levels but there is some discrepancy at the presumed level of significance of five per cent CO.
APTIC-25578

STUDIES ON THE COMBINED EFFECTS OF OZONE AND A HOT ENVIRONMENT ON REACTION TIME IN SUBHUMAN PRIMATES.

In: Project Clean Air. California Univ., Santa
Barbara, California Univ. Res. Proj. S-6, 8p., Sept.
1, 1970. 2 refs.
R. W. Reynolds, and R. R. J. Chaffee.
Identifiers: *Behavioral task, *Ozone, *Thermal radiation, Maximum allowable concentration, Primates.

Studies were undertaken to evaluate the possible deleterious effects of various levels of ozone and environmental heat on the ability of monkeys to perform a complex behavioral task. Whether such data could provide the basis for realistic standards for maximum acceptable concentrations of air pollutants is discussed. The particular behavioral paradigm combines a simple and a disjunctive or choice reaction time procedure which is described. The long term goal of the project is to determine the interrelationships of the three parameters of pollutant concentration, exposure duration, and temperature on both simple and choice reaction times. Preliminary indications suggest that there is a significant elevation of both simple and choice reaction time in an atmosphere containing 0.5 ppm ozone when the test is run after one half hour preexposure. (Author abstract modified)
APTIC-25579

REACTION OF NITROGEN OXIDES WITH BIOLOGICALLY IMPORTANT AMINES.

For primary bibliographic entry see Field 06.
APTIC-25580

NITROGEN DIOXIDE POISONING IN SILO ATMOSPHERES. (SILO-FILLERS' DISEASE).

Preprint, Minnesota Univ., Minneapolis, School
of Public Health, 14p., 1960. 11 refs. (Presented at
National Air Pollution Research Seminar, 3rd,
New Orleans, La., March 23, 1960.)
Leonard M. Schuman.
Identifiers: *Silo-fillers' disease, *Epidemiology, *Nitrogen dioxide (no2), Research programs, Questionnaires, Guinea pigs, Mice, Crops, Health statistics, Pathological techniques, Respiratory functions, Respiratory diseases, Farms, Field tests, Statistical analyses.

Investigations of aspects of silo gas poisoning are reviewed. A random sample of over 1600 farmers was intensively scrutinized by detailed questionnaire, vital capacity determination, and X-ray. Highly preliminary analysis shows an apparent 10% excess of chronic respiratory symptoms among farmers with 100 or more hrs of silo exposure over those with 0-99 hrs. Supplementary studies are being made: (1) a review of 44,000 autopsy protocols for pulmonary fibrosis and bronchiolities fibrosa obliterans; (2) a review of records of all cases having certain pulmonary conditions in 250,000 hospital admissions over a 20-yr period; (3) an epidemiological follow-up of suspect cases of silo gas poisoning; (4) laboratory studies of 1000 NO2-exposed mice, including low-dose (35 ppm) tests; (5) investigation in guinea pigs of a possible immunologic process in relation to the 2-3 wk period of symptom latency in the syndrome; (6) detailed field surveys of silage practices, crop and soil conditions, and actual NO2 production in silos; and (7) a study of factors in the ensiling process under controlled conditions in 27 specially-constructed laboratory silos, which also permit study of the bacterial and other enzymatic processes of fermentation in the denitrification process. The goal of these many projects is the ultimate control of the silo gas poisoning hazard to farm workers.
APTIC-25586

THE ROLE OF 3:4-BENZPYRENE IN THE EPIDEMIOLOGY OF LUNG CANCER.

Acta, Unio Intern. Contra Cancrum, vol. 19:486-
487, 1963.
R. E. Waller.
Identifiers: *Benzo (3-4)pyrene, *Epidemiology, *Lung cancer, Humans, Mortality, Smoking, Great britain, Non-urban areas, Urban areas.

Occupational studies provide strong evidence of an association between 3:4-benzpyrene and certain forms of cancer. The link with lung cancer is more difficult to define, but some information can be gained from studies made amongst the general population. In Great Britain there is no reason to connect the rise in lung cancer mortality with the 3:4-benzpyrene content of the air, since this is declining. Differences in mortality between urban and rural areas suggest however that air pollution plays some part, and the possibility of combined effects with cigarette smoke should be explored. (Author summary)
APTIC-25613

AIR POLLUTION FROM SOLDERING FUMES.

Ind. Med. Surg., 29 (1):36-38, Jan. 1960. 6 refs.
C. A. Boogaerdt, and H. De Mooij.
Identifiers: *Lead compounds, *Soldering, *Occupational health, Hematology, Urinalysis, Europe, Fumes, Samplers, Air quality measurements.

An examination of employees regularly engaged in soldering work has failed to reveal any fact which might point to their suffering from lead poisoning. Department one consisted of 475 men and girls engaged in assembling television sets, and in department two there were 250 girls putting together radio sets; department three employed about 30 girls in dip-solding capacitors and resistors, and department four employed five men tinning small objects by dipping them in large baths containing molten lead alloy. The two criteria chosen for the medical examination of 42 employees were coproporphyrinuria and basophilic granulation. Air samples were taken with millipore filters from four points as close as possible to the noses of employees while they were doing their normal work. In no individual was a high coproporphyrin content combined with an excessive percentage of stipple cells. Lead concentrations present in air and due to soldering were all found to be under 100 gamma/100 cu m.
APTIC-25624

REGRESSION USING 'HOCKEY STICK' FUNCTION.

Preprint, National Air Pollution Control
Administration, Durham, N. C., Div. of Health
Effects Research, 7p., 1970 (*). 1 ref.
Victor Hasselblad, Gene Lowrimore, and C. J.
Nelson.
Identifiers: *Statistical analyses, *Thresholds, Humans, Oxidants.

One of the problems associated with the establishment of criteria for air pollutants is that of determining acceptable levels. Because of the adaptive ability of the human system, it makes sense in some cases to speak of a threshold dose level, x-o, below which there is no response other than the background response, y-o. The dose-response relationship can then be described by regression functions, of which a particular case might be called the 'hockey stick' function. The function can be fitted by least squares as described, and its partial derivatives are given. An example is included for which the dependent variable is the percent of students with decreased athletic performance, and the independent variable is oxidant level in pphm 1 hour prior to a meet.
APTIC-25625

A NEW GLUE HOLDS RIGID CUP ECG SKIN ELECTRODES FOR 24 HOURS AND LONGER.

Preprint, National Air Pollution Control
Administration, Cincinnati, Ohio, Div. of Health
Effects Research, 9p., 1970. 5 refs.
Winston N. Bloch Jr., and Trent R. Lewis.
Identifiers: *Adhesives, *Acrylate, *Electrocardiograph, Laboratory animals, Dogs, Treatment and aids, Diagnosis, Esters.

With the use of cyanoacrylate monomer glue, there now exists a practical, feasible method to ensure continued skin contact of electrode and electroconductive paste, maintaining a stable electroconductive system. Until now, it has been necessary to surgically implant electrodes for prolonged use on free-ranging animals where electrocardiographic telemetry is used. In 200 applications, isobutyl 2-cyanoacrylate monomer kept rigid cup-type electrodes attached to skin, with electroconductive cream enclosed, for a 24-hour period in free-ranging dogs. In forty applications of more than 24 hours, the failure rate was 2.5%. (Author abstract modified)
APTIC-25626

INFLUENCE OF DUST EXPOSURE UPON THE DISTRIBUTION OF ALVEOLAR VENTILATION.

Nederlandse Organisatie voor Toegepast
Natuurwetenschappelijk Onderzoek, Delft,
Forschungsinstitut fuer Gesundheitstechnik, Pub.
244, p. 601-603, Feb. 1968. 9 refs.
L. H. Greve, P. E. Joosting, and B. F. Visser.
Identifiers: *Diagnosis, *Ventilation (pulmonary), *Dusts, Humans, Occupational health, Respiratory functions, Pulmonary function, Europe, Metal fabricating and finishing.

An investigation of pulmonary pathophysiology in relation to dust exposure should include lung ventilation, diffusion capacity, circulatory and perfusion conditions, and arterial oxygen and carbon dioxide pressure. It is suggested that the best way to study the distribution of alveolar ventilation is to use the almost insoluble test gas helium, to equilibrate the lungs with a mixture containing this

gas, and to analyze in an open system the wash-out of this gas instantaneously. The helium-curve has proven to be a valuable technique of identifying obstructive ventilatory distribution disturbances among 'healthy' foundry workers.
APTIC-25627

TOXICOLOGICAL STUDIES ON HYDROCARBONS. IX. THE ASPIRATION HAZARD AND TOXICITY OF HYDROCARBONS AND HYDROCARBON MIXTURES.

Arch. Environ. Health, vol. 6:329-341, March 1963. 9 refs. (Presented at the Industrial Hygiene Foundation, Annual Meeting, 27th, Pittsburgh, Pa., Oct. 24-25, 1962.)
Horace W. Gerarde.
Identifiers: *Breathing, *Toxic tolerances, *Hydrocarbons, Rats, Mortality, Pulmonary function, Toxicity, Asphyxiation, Respiratory diseases, Pneumonia, Aerosols, Solvents, Fuel oils, Gasolines, Kerosene, Olefines, Liquids.

A method is described for determining the aspiration hazard and toxicity of liquids and aerosols. It is used to determine the aspiration hazard and toxicity of a number of individual hydrocarbons and hydrocarbon mixtures by performing experiments on rats. Individual low-boiling hydrocarbons of the 3 major classes are highly toxic by this route of administration, causing death by cardiac arrest, respiratory paralysis, and asphyxia. A limited number of cycloparaffinic, cycloolefinic, and acetylenic hydrocarbons were tested and found to be toxic when aspirated into the lungs. The more volatile, smaller molecules caused death by cardiac arrest, respiratory failure, and asphyxia. All of the invidial hydrocarbons tested have a low viscosity, not exceeding 45 SSU at 100 F, and were readily aspirated. Hydrocarbon mixtures of low viscosity (lighter fluid, gasoline, kerosene) are readily aspirated and highly toxic by this route. Highly viscous materials such as paints, adhesives, asphalts, rubber cement etc., may contain high concentrations of hydrocarbon solvents and be without hazard by the aspiration route. Mineral oil and motor oils of comparable viscosity do not cause severe, acute pulmonary edema and hemorrhage characteristic of kerosene and similar low-viscosity hydrocarbon mixtures. The pulmonary effects produced by these hydrocarbons are the 'lipoid pneumonia' type of reaction-low-grade, chronic localized tissue reactions which are not fatal. The aspiration toxicity of kerosene was markedly reduced by blending with an equal volume of a lubricant oil. This blend, containing 50% kerosene and having a viscosity of 58 SSU at 100 F, caused no mortality and minimal lung injury based on lung weight. A straight petroleum oil with a viscosity of 59 SSU at 100 F was much less toxic than a petroleum distillate with a viscosity of 39 SSU at 100 F. The record of human experience with petroleum distillate intoxication by accidental ingestion incriminates liquids with viscosities below 45 SSU at 100 F--gasoline lighter fluid, kerosene, Stoddard Solvent, and mineral spirits. Viscosity is the most important physical property determining the aspiration hazard toxicity of liquid hydrocarbons. The effect of surface tension appears to be over-shadowed by viscosity, probably because surface tension varies within a narrow range for most hydrocarbon mixtures. (Author summary modified)
APTIC-25640

CARCINOGENS IN THE HUMAN ENVIRONMENT. (PART I).

A.M.A. Arch. Pathol., vol. 71:237-267, March 1961. PART II. Ibid., vol. 71: 355-380, April 1961. 290 refs.
W. C. Hueper.
Identifiers: *Cancer, *Carcinogens, Humans, Thresholds, Asbestos, Plastics, Coal tars, Soot, Solvents, Arsenic compounds, Chlorinated hydrocarbons, Aliphatic hydrocarbons, Aromatic hydrocarbons, Anthracenes, Beryllium compounds, Chromium compounds, Cobalt compounds, Iron compounds, Nickel compounds, Amines, Ultraviolet radiation, Radioactive radiation, Surfactants.

Environmental carcinogens are practically the only recognized causes of cancer in man. A few of these agents are natural, such as ultraviolet radiation of sunlight, or naturally contaminated soils or water. Most of them, however, are man-made products of industrial development. Recognized human carcinogens, their origin and distribution in the human environment, and the cancer caused by them are tabulated. They include: asbestos, arsenic, chromium, nickel, aromatic amines, benzol, anthracene, coal tar and pitch, soots, solvents, waxes, and radiation. Potential carcinogens include: aliphatic and aromatic epoxides, chlorinated hydrocarbons, estrogens, surfactants-detergents, certain plastics and cellophanes, beryllium, cobalt, selenium, and iron. The characteristics and classification of carcinogens are discussed, as well as threshold limit values. Many consumer products are potential sources of carcinogenic agents, including food additives, food dyes, pesticides, cosmetics, paint removers, and others. Because of the still far-reaching lack of factual knowledge on the carcinogenic agents already present in the human environment and the distinct difficulties encountered in discovering and identifying them by epidemiologic, medical, and experimental procedures, definite efforts should be made to prevent, as much as possible and practicable, any further addition of new industry-related carcinogens to the human environment.
APTIC-25681

NEUROLOGIC MANIFESTATIONS OF CHRONIC CARBON MONOXIDE POISONING.

New Engl. J. Med., 261 (24):1217-1220, Dec. 10, 1959. 9 refs.
Gordon J. Gilbert, and Gilbert H. Glaser.
Identifiers: *Nervous system, *Toxicity, *Carbon monoxide, Chronic, Adults, Males, Carboxyhemoglobin, Occupational health, Diagnosis, Engine exhausts, Automobiles.

A case of chronic carbon monoxide poisoning is reported to illustrate presenting symptomatology and diagnostic difficulties that may be encountered, as well as the significant and illuminating laboratory findings. The patient, a 50-year-old policeman, complained of episodes of loss of consciousness of 4 years' duration. These usually occurred between 3:00 and 5:00 pm, and consisted of a feeling of lightheadedness, lasting for 30 minutes to 2 hours, dizziness, staggering gait and somnolence, followed by a period of unconsciousness of 15 to 90 minutes' duration, during which the hands might twitch. Marked personality changes were observed over the previous few months, with increasing fatigability, tremor and sweating. An electroencephalogram showed basically irregular 10 to 12 cycles per second alpha rhythm and intermixed low-voltage, fast activity. Frequent synchronous and asynchronous single and multiple spikes, sharp waves and atypical spike-wave complexes of 2 to 4 cycles per second appeared bilaterally, in left-sided preponderance and with occasional focal signs of phase reversal from the left frontal and temporal regions. A detailed occupational history was obtained on a second admission to the hospital, and it was learned that his first few spells had occurred while he was directing automobile traffic, after which he requested transfer to the police garage. It was often necessary to run the motors of the police cars in the garage. Spectrophotometric examination of a blood sample indicated that the blood was 20% saturated with carbon monoxide.
APTIC-25695

THE EFFECT OF AIR POLLUTANTS ON THE EYE. I. THE EFFECT OF AN ORGANIC EXTRACT ON THE CONJUNCTIVAL GOBLET CELLS.

Can. J. Ophthalmol., 5 (3):226-230, July 1970. 16 refs.
M. A. Waheed, and P. K. Basu.
Identifiers: *Cells, *Eyes, *Benzo (3-4)pyrene, Rabbits, Eye irritation, Canada, Dusts.

An organic extract made from atmospheric dust containing benzo (a)pyrene and polycyclic hydrocarbons was applied directly to the conjunctiva of 15 albino rabbits. After eight days, there was a small but definite decrease in the number of goblet cells (mucus-secreting cells), although the extent of the decrease varied from animal to animal. Since the extract produced no clinical signs of conjunctival irritation such as watering or redness, it is possible that reduction in the number of goblet cells was due primarily to the effect of the extract and not, as suggested by another investigator, to any abnormal hydration.
APTIC-25703

FOOD IN A CARCINOGENIC ENVIRONMENT.

Food Mfr., 45 (11):47-50, 87, Nov. 1970. 47 refs.
Damazy J. Tilgner.
Identifiers: *Foods, *Carcinogens, *Aromatic hydrocarbons, *Polynuclear compounds, Plants (botany), Crops, Fruits, Vegetables, Ingestion, Europe, Food and feed operations, Benzo (3-4)pyrene.

Evidence is mounting that environmental contamination of agricultural raw materials is being caused by contaminated air, water, and soils. Air pollution, however, seems to be the most potent food contaminant and the major source of the polynuclear aromatic hydrocarbons which are present in all foods in concentrations of 0.2 to 15.8 micrograms/kg or more. Six carcinogenic polynuclear hydrocarbons have been identified in all analyzed leaves of green sald, cauliflower, potatoes, carrots, apples, apricots, edible mushrooms, and wheat and rye grain. Polynuclears, including benzo- (a)-pyrene have also been detected in vegetable oils and fats. A smaller proportion of carcinogenic hydrocarbons ingested by man come from food which is decomposed at elevated temperatures by roasting, toasting, grilling, or smoke curing. Global cooperation is necessary to reduce carcinogens to safe levels and inter-disciplinary studies are required to evaluate fully the connection between food and cancer.
APTIC-25704

METALLIC MENACE IN THE ENVIRONMENT.

Fortune, 83 (1):110-113, 125, Jan. 1971.
Gene Bylinsky.
Identifiers: *Toxicity, *Metal compounds, Federal governments, Air quality standards, Occupational health, Enzymes, Non-urban areas, Urban areas, Engine exhausts, Beryllium compounds, Lead compounds.

The flow of metallic pollutants to the environment has accelerated in recent decades to such an extent that the public at large may be threatened with what used to be considered 'occupational' health hazards mines or factories. The serious difficulty with these pollutants is their persistence; unlike organic substances, no metal is degradable by natural processes. The first efforts to combat metallic pollution are represented by criteria to be issued this year by the Federal government for permissible lead concentrations in ambient air. Guidelines for beryllium will follow next year. Later, other metals will come under control. Because of the economic implications of control, it is essential that 'safe' levels for metallic pollutants be based on sound data. The search for data on lead is reviewed; future lead levels may be determined by recent investigations indicating the effects of low-lead levels on ALA-dehydrase activity.
APTIC-25705

A HEALTH-SOCIOLOGICAL STUDY ON PNEUMOCONIOSIS IN A COPPER MINE

AFTER THE ENFORCEMENT OF THE PNEUMOCONIOSIS LAW.

(Jinhai-ho shikogo ni okeru a kogyosho no jinhai no hokenshakaigakuteki kenkyu). Text in Japanese. Rodo Kagaku (J. Sci. Labour, Tokyo), 46 (11):656-680, Nov. 1970. 61 refs.
Kazuko Suda.
Identifiers: *Occupational health, *Pneumoconiosis, Legislation, Socio-economic factors, Humans, Adults, Pneumonoconiosis, Copper, Japan, Mining.

A health-sociological factor analysis was carried out on the pneumoconiosis problem in a copper mine herein called mine A. The items of discussion include a treatise on the occurrence and the development process of pneumoconiosis, such as causes and prevention, the present status of prevention, the historical data on its occurrence, and the process in which officially recognized victims are determined. A long list is presented of victims who were awarded accident compensations at mine A. The tabulation is by name, application date, date started work, last position held, an types of pneumoconiosis or silicosis falling into the compensation category. Other topics include the socio-economic factors that promote the affliction as well as the types of work at the mine, the labor policy of the mining company, the relationship between the labor policy and the affliction as well as the progress of the disease. The conclusion is that the employment policy of the company as well as the socio-economic structure of the society, despite the Pneumoconiosis Law and various compensations, compel the workers to work harder, even under the condition of illness.
APTIC-25722

EFFECTS OF CERTAIN CHEMICAL SUBSTANCES ON PROTEIN CONTENT OF BLOOD SERUM AND OF BONE MARROW.

(Deystviye nekotorykh khimicheskikh veshchestv na belkovyy sostav syrovotski krovi i punktata kostnoogo mozga). Text in Russian. Gigiena i Sanit., no. 8:112-113, 1970. 5 refs.
A. S. Faustov, and N. V. Lobeyeva.
Identifiers: *Proteins, *Toxicity, Chronic, Rabbits, Hematology, Bones, Circulatory system, Ussr, Butadienes, Benzenes, Styrenes, Toluenes, Aluminum compounds.

The effects of chronic inhalation poisoning with isoprene (400 mg/cu m), styrene (50 mg/cu m), toluene plus triisobutylaluminum (5 and 100 mg/cu m, respectively), and toluene plus 1,3-butadiene (50 mg/cu m, total) on blood-serum and bone-marrow protein content in rabbits are reported. Greater changes were noted in the protein of bone marrow than in peripheral blood serum; in the first case, the reduction in quantity of finely dispersed proteins and increase in coarsely dispersed proteins are statistically significant, with a 95-99% probability, for all of the toxicants investigated. Similar shifts were detected in blood serum protein only in the case of styrene.
APTIC-25738

RELATIONSHIP BETWEEN AIR POLLUTION AND ASTHMATIC DISEASES AMONG PRIMARY SCHOOL CHILDREN IN KITA-KYUSHU. PART I. STATISTICAL ANALYSIS BASED ON QUESTIONNAIRES.

(Kita-Kyushu shi ni okeru gakudo no zensokuyoshikkan to taiki osen to no kankei. sono. 1.). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4 (1):51, 1969. (Proceedings of the 10th Annual Meeting of the Japan Society of Air Pollution, 1969.)
Namio Saruta, Shin Ishinishi, Elizaburo Kunitake, Yoko Katori, and Tokuro Nagayama.
Identifiers: *Asthma, *Air quality measurements, *Statistical analyses, Questionnaires, Socio-economic factors, Skin tests, Pulmonary function, Japan, Urban areas, Meteorology, Children, Epidemiology.

An epidemiological study was conducted on the relationship between the air pollution and asthmatic diseases among schoolchildren in Kita-Kyushu. Based on the ten-year record of air pollution, two schools in the polluted areas and two in the non-polluted area were chosen. Questionnaires concerning coughing and asthma attacks as well as socio-economic data were completed by the parents. For those complaining of asthma, pulmonary function test, skin test, etc. were performed. Various percentage of complaints are tabulated. Asthmatic attacks occur often in winter and in the polluted area on smoggy days. Similar results were obtained when asthma complaints were analyzed according to the amount of pulmonary residence, educational level, and occupation of parents. It is evident that there is a close relationship between air pollution in Kita-Kyushu and the number of asthma complaints by children.
APTIC-25739

FINDINGS OF PFR ON SO2 HIGH SENSITIVE SCHOOL CHILDREN.

(SO2 kokanjusei gakudo no saidai kokiryuryo ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4 (1): 67, 1969. (Proceedings of the 10th Annual Meeting of the Japan Society of Air Pollution, 1969.)
Hiroshi Watanabe, Fusa Kaneko, Hisako Murayama, and Shigeo Yamaoka.
Identifiers: *Pulmonary resistance, *Temperature (atmospheric), *Sulfur dioxide, Children, Males, Japan, Urban areas, Commercial areas, Industrial areas, Statistical analyses.

Different effects of air pollution on schoolchildren due to different sensitivities of their pulmonary function resistance (PFR) were studied. Male schoolchildren from two schools in each of the industrial and commercial districts of Osaka were examined. PFR was measured by a peak-flow meter and sulfur dioxide concentration in the atmosphere was determined by load peroxide and electroconductivity methods. Atmospheric temperature was furnished by Osaka Regional Meteorological Observatory. School 'O' in the industrial area, is perennially polluted, and there are occasional incidences of high concentration pollution. School S has high concentration in the cold season. PFR and SO2 concentration show negative correlation and PFR and temperature show positive correlation. Schoolchildren were divided into SO2-sensitive and temperature-sensitive types. In school 'O', both types were each 38% of the total number of pupils, and in school S, the SO2- and temperature-sensitive types were 27% and 54%, respectively. Based on the height and PFR of children living in suburban unpolluted areas, a regression line was constructed to calculate expected PFR values. For different areas and for SO2- and temperature-sensitive types, the percentage ratio of actual to expected PFR was obtained. In the cold-season pollution area, both types show a decline in the PFR ratio only in the cold season. On the other hand, in the chronically polluted area, the PFR ratio declines for both cold and warm seasons, but only SO2-sensitive types are markedly influenced by pollution.
APTIC-25740

EXTENSIVE PULMONARY CHANGES IN AN APPARENTLY LIGHT NITROGEN OXIDES POISONING.

(Rozlegle zmiany w pluchach przy pozornie lekkim zatruciu tlenkami azotu). Text in Polish. Med. Pracey (Lodz), 18 (2):195-198, 1967. 10 refs.
Wladyslawa Oleniacz, Lucyna Witkowska, and Irena Balcerowska.
Identifiers: *Lungs, *Toxicity, *Nitrogen oxides, Humans, Occupational health, Pathological techniques, Europe.

A case of occupational poisoning by nitrogen oxides is presented. The development and the treatment of the disease the symptoms of which completely disappeared after 2 months are described. The pathogenesis of swellings in the pulmonary parenchyma occurring twice during the disease, immediatley after the injury and then after 11 days of treatment, is interesting, as its pattern seems to confirm existence of two mechanisms of lung damage previously described, i.e., direct toxic damage of pulmonary tissue or chemical inflammation of lungs, followed by complex autoagressive mechanism. The etiological and pathogenetic factors of these changes are discussed.
APTIC-25747

SULFUR DIOXIDE.

Chemical Safety Data Sheet SD-52, 15p., 1953.
Personal Author Not Recorded.
Identifiers: *Occupational health, *Sulfur dioxide, Humans, Respiratory system, Skin, Eye irritation, Health impairment, Transportation, Ventilation, Safety equipment, Gases, Liquids.

Sulfur dioxide gas is irritating to the throat and upper respiratory system. Contact with its liquid form will cause burns of the eyes and skin. The burning effect on the skin is due to its attendant freezing effect. However, it has good warning properties, and the hazards connected with its handling can be minimized. Requirements with regard to the loading and unloading and storage of sulfur dioxide containers are listed, together with measures to be taken in case of leakage and protective equipment to be worn by employees working with the gas. The recommendations presented are considered to represent the best opinions on the subject as of 1953.
APTIC-25751

A STUDY OF THE EFFECTS OF AIR POLLUTANTS ON THE EYE.

A.M.A. Arch. Ind. Health, 21 (1):1-5, Jan. 1960. 28 refs.
Stacy R. Mettier Jr., H. Karl Boyer, C. H. Hine, and W. K. McEwen.
Identifiers: *Eye irritation, *Acrolein, *Sulfur dioxide, *Ozone, *Nitrogen dioxide (no2), Acute, Chronic, Rabbits, Eyes.

Rabbits were exposed acutely and chronically to acrolein (2 ppm), ozone (2 ppm) sulfur dioxide (10 ppm) and nitrogen dioxide (20 ppm) and then examined for the effect of the toxicants on intact and deepithelized corneas. Specifically, the degree of chemosis and iritis and the rate of regeneration were noted. No adverse effects could be detected by clinical, biochemical, or histological examinations. The effect of these gases, and presumably smog in general, is at a lower subjective sensory level.
APTIC-25756

HEALING IN RAT LUNG AFTER SUBACUTE EXPOSURE TO NITROGEN DIOXIDE.

Am. Rev. Respirat. Disease, 100 (5):662-676, 1969. 14 refs.
G. Freeman, S. C. Crane, and N. J. Furiosi.
Identifiers: *Healing, *Lungs, *Nitrogen dioxide (no2), Rats, Age, Tissues, Repiratory functions, Exposure methods.

The nature of healing was observed in rats after 1, 4, 10, 16, and 20 weeks of continuous exposure to 15 plus or minus 2 ppm nitrogen dioxide. Animals from each group were allowed to recover for 0, 8, 20, and 52 weeks and were compared with control rats of the same age. Lung weights increased at two different times as compared with those of control animals. The first was associated with hypertrophy of bronchiolar and adjacent alveolar epithelium. This tended to return toward normal during recovery. The second occurred in aging, recovering rats, long after contact with nitrogen oxide had ceased. This was consistent with an increase in the staining property of collagen and elastic tissue in the alveolar parenchyma, which was most noticeable in the ductal areas. Between the two increments, lung weights were equivalent to those of control animals. Healing in the longe

exposed rats left some inhomogeneity of the air spaces of the parenchyma and some partial and, possibly, complete closure by fibrosis of the terminations of the bronchioles. Septal walls were sometimes attenuated and fractured. Both atresia of terminal bronchioles and discontinuities in altered elastic tissue may account in part for the apparently reduced elastic recoil of lungs of exposed animals. (Author summary)
APTIC-25759

AIR POLLUTANT EXPOSURE AND RESPIRATORY CANCER.

In: Project Clean Air, vol. 2, App. D. California
Univ., San Diego, School of Medicine, p. D-1 to
D-7, 1970. 11 refs.
Michael B. Shimkin.
Identifiers: *Carcinogens, Laboratory animals, Humans, Epidemiology, Synergism, Lung cancer, Health impairment, Influenza, Asbestos, Coal tars, Gasolines, Arsenic compounds, Aromatic hydrocarbons, Polynuclear compounds, Amines, Radioactive radiation.

Air pollution represents an important health hazard to man and other animal species. The hazards include the development of cancers of the respiratory tract, especially the lung. This conclusion is well supported by epidemiological studies on human populations, and by laboratory studies on animals. The degree of carcinogenic hazard from air pollution is related to the presence of cancer-producing and cancer-accelerating materials in the atmosphere, such as asbestos, arsenic, aromatic amines, coal tar, petroleum products, and radiation, as well as their concentration and physical state. The basis of air pollution control policies must be two-fold: the reduction of the total contaminants, and the selective elimination of particularly hazardous chemicals as they are defined. Such definitions must include multiple agents, such as asbestos plus polycyclic hydrocarbons, or ozonized gasoline plus influenza virus. Additional knowledge regarding the carcinogenic hazards of air pollution must be derived from two types of study: epidemiologic analyses of human populations (studies of occupational groups provide data on higher dose levels of exposure often involving surrounding populations); and laboratory animal studies on suspected carcinogenic environments, providing data for exploration in man. These two areas of research are closely inter-related. (Author conclusions modified)
APTIC-25765

THE WORK OF AN OCCUPATIONAL HYGIENE SERVICE IN ENVIRONMENTAL CONTROL.

Ann. Occup. Hyg., 6 (2):55-64, April-June 1963. 6
refs.
R. I. McCallum.
Identifiers: *Occupational health, *Great britain, *Industrial emission sources, Control agencies, Maximum allowable concentration, Hematology, Urinalysis, Skin, Diseases and disorders, Pneumonoconiosis, Chemical processing, Antimony compounds, Lead compounds, Ships.

Industrial hygiene services which cater for industry as a whole face difficulties arising from widely varied industries, their geographical position and the different outlooks of individual firms. The work of the North of England Industrial Health Advisory Service is briefly described. Amongst other problems, it is at present concerned with lead absorption and poisoning in burners in the shipbreaking industry, and skin irritation and pneumoconiosis in antimony process workers. Data are presented showing that excessive amounts of lead in air are present in shipbreaking yards. The Service provides facilities for regular blood and urine tests of burners in the Newcastle area, to help control lead absorption. No solution has yet been found for adequate control of the environment. The fine trioxide of antimony easily escapes into the atmosphere during smelting and may penetrate clothing, and be inhaled. In warm weather especially, irritation of the skin or antimony spots are produced. Antimony pneumoconiosis appears to be symptomless but further observation is required to confirm this. Data are given for antimony in air at the works, which show levels well above the Maximum Allowable Concentration and steps are being taken to reduce the amount of fume. It is emphasized that environmental control is fundamentally a biological problem and that education of industry in the use of Occupational Hygiene Services is essential. It is an advantage to such a Service if it is linked with a University. (Author abstract)
APTIC-25767

BIOLOGICAL ASPECTS OF AIR POLLUTION.

In: Problems and Control of Air Pollution. F. S.
Mallette (ed.), New York, Reinhold, 1955, Chapt.
3, p. 23-31. 10 refs.
Norton Nelson.
Identifiers: *Diseases and disorders, Humans, Epidemiology, Morbidity, Toxic tolerances, Allergies, Lung cancer, Carcinogens, Eye irritation, Organic diseases, Respiratory diseases, Benzopyrenes, Sulfur dioxide.

Present knowledge and research needs are briefly surveyed for five biological effects of air pollution: systemic disease, eye irritation, skin irritation, respiratory irritation, and lung cancer. The first is of least widespread significance at present, but possible difficulties should be watched for. Individual variations in susceptibility to eye irritation, and comparative irritancy of different substances, require further investigation, as well as the possible use of eye irritation as an indicator of irritancy of materials. Specific allergic skin sensitivities from air contaminants also await further study. Direct and indirect effects on the respiratory tract are perhaps the most significant; as the eye is more sensitive than the skin, so the pulmonary tissues are more sensitive than the eye. These respiratory effects are described with emphasis on sulfur dioxide, as well as recent research showing functional changes from concentrations below sensory threshold, the complications of epidemiological studies in separating causative factors which occur together, and in measuring morbidity from air contaminants. The difficulties in investigating air pollution and lung cancer are reviewed. There are materials in urban atmospheres known to be capable experimentally of producing cancer; the amounts are low but of unknown significance. At present, the confusing factors cannot be untangled; much improved epidemiological and laboratory data are required.
APTIC-25775

FEATURES OF A COMBINED ACTION OF SULFUROUS GAS AND CARBON MONOXIDE IN THEIR JOINT PRESENCE IN THE ATMOSPHERE.

(Kharakter kombinirovannogo deystviya
sernistogo gaza i okisi ugleroda pri ikh
sovmestnom prisutstvii v atmosfernom
vozdukhe). Text in Russian. Gigiena i Sanit., 33
(4):73-77, 1968. 16 refs.
K. Basmadzhieva, G. Kurchatova, E. Davidkova,
and I. Tsvetanov.
Identifiers: *Synergism, *Toxicity, *Carbon monoxide, *Sulfur dioxide, Chronic, Rats, Hematology, Pathological techniques, Enzymes, Glands, Kidneys, Lungs, Europe.

Chronic 16-hour daily exposure of rats to a sulfur dioxide/carbon monoxide mixture at concentration ratios of 0.15:0.5 and 1:6 mg/cu m led to disturbances in the proper chronaxie of antagonistic muscles, cholinesterase activity, SH-group content of blood serum, and vitamin C content of the adrenals. Interstitial-pneumonic changes in the kidneys were also observed. The combined presence of SO2 and CO in the atmosphere has a simple additive, or perhaps slightly enhanced, effect on animals.
APTIC-25790

CARBON MONOXIDE IN TOWN AIR: AN INTERIM REPORT.

For primary bibliographic entry see Field 04.
APTIC-25799

THE EFFECT OF CARBON MONOXIDE ON TISSUE RESPIRATION. CHRONIC CARBON MONOXIDE POISONING SERIES VI.

Med. J. Shinshu Univ., 3 (4):289-298, Dec. 1958. 7
refs.
Shiro Kamei.
Identifiers: *Respiratory functions, *Carbon monoxide, *Tissues, Chronic, Rats, Retention, Toxicity, Japan, Oxygen, Oxidation, Heart, Liver, Kidneys.

The effect of long-term inhalation of carbon monoxide on tissue respiration of various organs was studied in rats with or without administering vitamins (thiamin, riboflavin, and nicotinic acid). Twelve rats were exposed to 0.10% CO three hours a day for 90 days. Tissue respiration was estimated by oxygen uptake and methylene blue reduction of tissues. Oxygen uptake was depressed in liver, kidney, and heart following exposure to CO. However, the depression was less marked in livers and kidneys of the animals receiving vitamins. Methylene blue reduction was also impaired in organs from the exposed animals, though impairment was slight in the group with vitamin administration. Histological studies of the liver of the exposed animals showed evidence of fatty infiltration of liver cells. This developed after 30 days exposure and became more severe with increasing exposure. The infiltration is thought to be the result of an incomplete oxidation of carbohydrate by the tissue due to anoxia caused by chronic carbon monoxide poisoning. (Author summary modified)
APTIC-25800

EXPERIMENTAL STUDY ON BLOOD PRESSURE IN CARBON MONOXIDE POISONING. (CHRONIC CARBON MONOXIDE POISONING SERIES XI).

Med. J. Shinshu Univ., 4 (1):47-52, March 1959. 8
refs.
Masaru Kubota.
Identifiers: *Blood pressure, *Carbon monoxide, Rabbits, Japan.

Fluctuations in blood pressure were studied in rabbits during and after exposure to various concentrations of carbon monoxide. Rise or fall in blood pressure during inhalation of CO was found to depend on the concentration inspired. Inhalation of 0.10% CO produced an initial increase in blood pressure followed by a gradual decrease. Inhalation of 0.15, 0.20, 0.25, and 0.30% CO produced a temporary decrease in blood pressure followed by a rapid increase and subsequent gradual decrease. Exposure to 0.35 or 0.60% CO brought about a remarkable depression of blood pressure without any initial increase. After termination of exposure to CO, blood pressure continued to rise for three hours and then returned to a normal level.
APTIC-25802

THE EFFECT OF PROLONGED EXPOSURE TO CARBON MONOXIDE ON HUMAN HEALTH.

Med. J. Shinshu Univ., 3 (3):165-177, Sept. 1958.
24 refs.
F. Komatsu, S. Honda, N. Murayama, I.
Hashimoto, and T. Inoue.
Identifiers: *Occupational health, *Carbon monoxide, Chronic, Continuous, Humans, Males, Hematology, Carboxyhemoglobin, Diagnosis, Respiratory functions, Toxicity, Japan, Electric furnaces, Chemical processing.

A survey was undertaken concerning the health of workers in a factory where carbon monoxide is emitted. The factory produces nitrolime and carborundum; depending upon the ventilation, air motion, and the stoking of coal, the amount of CO to which the workers were exposed ranged between 50 and 250 ppm. Subjective symptoms of

the workers in the group exposed to CO (group A) were more frequent than those who had no exposure to CO but did heavy muscular work (group B) and those who sat at their desks (group C), Most of the physical signs were also more frequent in group A, and the average vital capacity of the workers in this group was smaller than for those in Group B and C. A similar finding was seen for back strength, while the average blood content of CO hemoglobin was also highest in group A.
APTIC-25810

INTERMITTENT AIR POLLUTION EPISODE IN NEW YORK CITY, 1962.

Public Health Rept. (U. S.), 78 (12):1061-1064, Dec. 1963. 2 refs.
Leonard Greenburg, Carl Erhardt, Franklyn Field, Joseph I. Reed, and Nathan S. Seriff.
Identifiers: *Air pollution episodes, *Age, *Respiratory diseases, *New york city, Humans, Mortality, Health impairment, Stability (atmospheric), Inversion.

A meteorological pattern from November 27 through December 4, 1962, brought periods of stable weather to New York City which provided an opportunity to study the effects of intermittent air pollution on health. Air pollution reached high levels during this period, but the concentrations were not sustained throughout the days, mainly because of brisk winds and the dissipation of ground level inversions during the afternoon. On November 30, 1962, the inversion persisted through the entire day. No significant increase was found in daily mortality for New York City or in the visits for upper respiratory complaints, asthma, and cardiac conditions to emergency clinics at five major city hospitals and the Chase Manhattan Bank clinic, or in visits recorded by the Blue Shield Health Insurance Plan. However, during this period visits for upper respiratory infections increased significantly at four old-age homes. (Author summary)
APTIC-25829

CELL AND SOLUTION VELOCITY CONSTANTS FOR THE REACTION CO + HB YIELDS COHB AT DIFFERENT TEMPERATURES IN MAMMALS WITH DIFFERENT RED CELL SIZES.

J. Gen. Physiol., vol. 49:199-200, Nov. 1965. 26 refs.
Robert A. B. Holland.
Identifiers: *Carboxyhemoglobin, *Blood cells, *Reaction kinetics, Goats, Rabbits, Humans, Membranes, Australia, Carbon monoxide, Thermodynamics, Temperature.

Using a double beam stopped-flow apparatus, measurements were made of the velocity constant of the reaction carbon monoxide + hemoglobin yields carboxyhemoglobin in solution and in the red cells of human beings, rabbits, horses, and goats. The solution constant at 37 C for human beings was 362 liters/millimole/sec, in other species was somewhat lower. Two rabbits, despite having apparently identical hemoglobins had significantly different values for l. The energy of activation (E) of l was between 8 and 11 kcal/mole in all cases. The cell reaction constant (l) at 37 deg was between 61 and 73 liters/millimole/sec in all cases; at 37 deg, the trend was for the smaller cells to have the higher l. This cell size effect was much less than previously found for the faster oxygen reaction. This showed that by merely increasing the rate of chemical reaction, it was not possible to increase cell uptake rate beyond a certain level; this level was dependent on the size and membrane properties of the cell. At lower temperatures, l was a more important factor in determining l than was cell size. The cell membrane was a barrier to gas diffusion in all species. The effect of temperature on l was also measured and was less than its effect on l at most temperatures. Temperature effect increased in small cells at low temperatures. Both these findings are in accordance with predictions based on differentiation of Roughton's equations. (Author abstract modified)
APTIC-25835

EXPERIMENTAL CARBON MONOXIDE POISONING: ITS ELECTROPHYSIOLOGICAL EFFECTS ON THE VISUAL PATHWAY IN CATS.

Folia Psychiat. Neurol. Jap., 23 (2):135-142, July 1969. 9 refs.
Terutika Ikeda.
Identifiers: *Eyes, *Nervous system, *Toxicity, *Carbon monoxide, Cats, Blindness, Eye irritation, Japan.

Cats were observed during and after carbon monoxide exposure; evoked potentials were measured in the visual pathway. During CO exposure, the cortical evoked potential, especially postsynaptic elements, was greatly diminished, but its changes were reversible. Cortical presynaptic potential did not increase during CO exposure, but afterward progressively decreased within several days. exposure, the lateral geniculate potential was intact or increased and the direct cortical response remained unchanged. These changes were coincidental with the histological findings that the degeneration was mainly located in the optic radiation fibers and the demyelinisation progressed for some time after CO exposure. (Author abstract modified)
APTIC-25836

INTRODUCTION AND SUMMARY.

In: Project Clean Air. Task Force No. 2, Section 1, 4p., Sept. 1, 1970.
Personal Author Not Recorded.
Identifiers: *Research programs, *Health impairment, Chronic, Laboratory animals, Humans, Epidemiology, Cancer, Cardiovascular diseases, Mutations, Respiratory diseases, Automotive emissions, Vehicles, Mathematical modeling, Simulation, Lead compounds.

The evaluation of biomedical effects of air pollution from epidemiologic evidence and from experimental studies of known single components and of crude natural or simulated pollutants; the review of animal models of disease production which may serve as sensitive detectors of biomedical hazard; the review of biologic studies which might reveal mechanisms of action of air pollutants; and the defining of future studies aimed at predicting hazards to health as control measures are considered. As present types of pollution change as the result of innovations in transportation systems, fuels, power generation and agricultural and industrial processing are assessed. Findings are reviewed in relation to respiratory symptoms and short-term disability, chronic lung disease and cancer, the relation of air pollution to auto accidents and heart disease, the presence and hazards of lead, persons with special susceptibility to air pollution, potential chromosome damage and birth defects, and suspected major pollutants. Recommended projects include health effects of present and future modes of transportation, of present and future stationary source pollution, population health surveillance, detection and prediction of pollutants causing cancer, chromosome damage and birth defects, pollutant interaction with cell chemistry, effects of air pollution on mental and emotional well-being, and modeling of health effects-pollution interactions.
APTIC-25840

ASBESTOS PLEURISY.

Diseases Chest, 46 (1):78-81, July 1964. 10 refs.
H. B. Eisenstadt.
Identifiers: *Pleurisy, *Asbestos, Humans, Occupational health, Biopsy, Lungs, Asbestosis.

A case of benign asbestos pleurisy is described. This disease differs greatly from the classic picture of pulmonary asbestosis. It is probably not as uncommon as it would appear from the sparsity of reports in the literature. Asbestos pleurisy is usually not recognized because it has a benign, self-limited course requiring no specific therapy. It can be suspected in a person having been exposed to this substance for a prolonged period of time. Such contact may have taken place recently or a number of years ago. The correct diagnosis requires not only pleural, but also lung biopsy for the demonstration of asbestos bodies. Asbestosis must be considered in the differential diagnosis of any form of idiopathic pleurisy. (Author summary modified)
APTIC-25844

INHIBITION OF CARCINOGENESIS.

Arch. Environ. Health, 9 (8):169-179, Aug. 1964. 32 refs.
Hans L. Falk, Paul Kotin, and Sandra Thompson.
Identifiers: *Inhibition, *Carcinogens, *Benzopyrenes, Mice, Tumors, Aromatic hydrocarbons, Anthracenes, Reaction mechanisms.

The activity of carcinogenic hydrocarbons can be inhibited by closely related pure compounds or by crude mixtures including a spectrum of polycyclic aromatic hydrocarbons when both carcinogen and anticarcinogen are administered simultaneously. Though this effect is maximum when the agents are administered simultaneously, inhibition can also be observed when the anticarcinogen is administered several days before or after the administration of the carcinogen. Both the potency of the carcinogen and the degree of inhibition are significantly related to the vehicle used, the dose of the carcinogen, the ratio of the anticarcinogen to the carcinogen, and the structural relationship of the anticarcinogens to carcinogens as determined by a study using C57 black mice. A single paradoxical observation in which phenanthrene enhanced the carcinogenicity of dibenz (a,h)anthracene was made using triethylene glycol as vehicle. Studies on anticarcinogenesis provide one additional tool for studying mechanisms of carcinogenesis. The mechanism of action, specifically, competition for receptors, be they -SH groups or others, offers a possible explanation for the observation in most of the experiments. It appears inadequate, however, to explain the inhibition of benzo (a)pyrene carcinogenesis by related aromatic polycyclic hydrocarbons at a molar ratio of anticarcinogen to carcinogen of less than one. (Author summary modified)
APTIC-25845

POSSIBLE LONG TERM EFFECTS OF EXPOSURE TO SULPHUR DIOXIDE.

Brit. J. Ind. Med., vol. 7:82-86, 1950. 10 refs.
A. Anderson.
Identifiers: *Health impairment, *Sulfur dioxide, Humans, Occupational health, Asia, Stack gases, Petroleum production.

In order to determine the possible long term effects of exposure to sulfur dioxide, oil refinery workers exposed to daily concentrations of SO2 for periods of time varying from 1 to 19 years were examined. Special attention was paid to age, weight, blood pressure, vital capacity, and radiography of the chest. The daily concentration of sulfur dioxide varied between 0 and 25 ppm. Occasionally, figures of 100 ppm were recorded. Workers not exposed to SO2 but otherwise subject to similar working conditions and to similar living conditions were also examined, special attention being paid to the same details of examination. No evidence of adverse effects on health could be found. (Author summary modified)
APTIC-25846

BIOCHEMICAL STUDIES ON THE TOXICITY OF TETRAETHYL LEAD AND OTHER ORGANO-LEAD COMPOUNDS.

Brit. J. Ind. Med. (London), 16 (3): 191-199, July 1959. 28 refs.
Jill E. Cremer.
Identifiers: *Nervous system, *Toxicity, *Tetraethyl lead, Rats, Health impairment.

The actions of purified tetra-, tri-, and di-ethyl lead on rats and rat brain slices and brain brei have been examined. A method based on a reaction with dithizone and capable of estimating tri-and di-ethyl tin in rat tissues has been developed. After injection into rats, tetraethyl lead is converted into triethyl lead and this is responsible for the toxic effects. Diethyl lead is much less toxic and the effects are different. The utilization of lactate and the oxidation of glucose by brain brei and slices respectively are inhibited by triethyl lead. A similar effect is seen in slices taken from rats poisoned with tetra- or tri-ethyl lead. Rat liver cell microsomes readily convert tetraethyl to triethyl lead and the latter is stable and remains in the animal tissues for several days. The concentration of triethyl lead in the brain is not high in comparison with other tissues but brain tissue appears to be unduly sensitive to its toxic action. Neither tetra- nor tri-ethyl lead reacts with B.A.L. or ethylene-diamine-tetra-acetic acid (E.D.T.A.). Diethyl lead reacts with B.A.L. but not with E.D.T.A. (Author abstract)
APTIC-25847

URBAN-RURAL DIFFERENCES IN LUNG CANCER MORTALITY RATES IN THE STATE.

Penn. Med. J., 66 (2):43-46, Feb. 1963. 13 refs.
Hugh R. Gilmore Jr., and David M. Anderson.
Identifiers: *Lung cancer, *Pennsylvania, *Non-urban areas, *Urban areas, Socio-economic factors, Mortality, Carcinogens, Pollutants.

Urban death rates for cancer of the respiratory tract and/or the chest cavity are higher than rates in rural areas. In Pennsylvania, nearly four hundred unexplained excess urban deaths occur annually due to these causes. Several explanations have been suggested: migration of older and ill individuals to the city, better diagnosis and better reporting in urban areas, difference in smoking habits, occupational exposure to carcinogens, socioeconomic conditions, and air pollution. Migration, better diagnosis, better reporting, and differences in smoking habits account for only an 18 to 30% excess urban death rate compared to the 58 to 130% excess actually observed. Occupational exposure to carcinogens and socioeconomic conditions are variables which may be factors in urban areas. It appears, however, that at least some of the unexplained excess deaths are due to an environmental factor other than those mentioned above. Air pollution is suspect as this unknown factor. (Author conclusions)
APTIC-25849

INTERACTION OF BENZO (A)PYRENE (BAP) WITH MAMMALIAN CELLS IN CULTURE.

In: Project Clean Air, Vol. 2. California Univ., San Francisco, Cancer Research Inst., California Univ. Research Proj. S-8, 13p., Sept. 1, 1970. 3 refs.
T. Timothy Crocker, and Ronald E. Rasmussen.
Identifiers: *Genetics, *Mutations, *Benzopyrenes, Mice, Tissue cultures, Carcinogens.

Polycyclic aromatic hydrocarbons are found as air pollutants in a variety of situations ranging from auto exhaust to tobacco smoke. They are of particular interest because several of them have been shown to be highly carcinogenic in experimental animals. One of the most potent of these carcinogens is benzo (a)pyrene (BaP). The interaction of this carcinogen with the genetic material (DNA) of mouse embryo cells in culture was studied. Results indicate that: BaP is bound to replicating and non-replicating DNA; the bond formed between BaP and DNA is relatively stable, with a half-life of about 7 days; and BaP apparently remains attached to DNA when DNA replicates. These results suggest that BaP may exert mutagenic effects in mammalian cells, and may interfere in other ways in the replication of DNA. Since studies in other laboratories indicate that other carcinogenic polycyclic hydrocarbons undergo similar kinds of interactions, the results of the described studies on BaP may serve as a guide to the potential hazards of polycyclic hydrocarbons as a class. (Author abstract modified)
APTIC-25850

AREA METEOROLOGY.

For primary bibliographic entry see Field 05.
APTIC-25855

ECOLOGICAL STATISTICAL STUDIES CONCERNING ENVIRONMENTAL POLLUTION AND CHRONIC DISEASE.

IEEE (Inst. Elec. Electron. Engrs.) Trans. Geosci.
Electron., 8 (4):186-202, Oct. 1970. 65 refs.
(Presented at the International Geoscience
Electronics Symposium, Washington, D. C., April
14-17, 1970.)
Richard J. Hickey, David E. Boyce, Evelyn B.
Harner, and Richard C. Clelland.
Identifiers: *Statistical analyses, *Diseases and disorders, Chronic, Age, Genetics, Mortality, Cancer, Cardiovascular diseases, Mutations, Urban areas, Computer programs, Cadmium compounds, Copper compounds, Titanium compounds, Nitrogen dioxide (no2), Sulfur dioxide, Sulfates.

Ecological statistical studies employing methods of multivariate analysis, based on a radiomimetic or mutagenic hypothesis, have yielded a number of statistically significant multiple regression equations in which concentrations of environmental chemicals, largely air pollutants, predict annual mortality rates for major categories of cancer and heart disease, as well as for congenital malformations, for populations of 38 metropolitan areas of the United States. Median age of these populations was also predicted statistically. Squares of multiple correlation coefficients in excess of 0.5 were frequently obtained for these equations along with related t and F statistics of suitable magnitude. A new computer program for optimal regression analysis was employed in the studies. Among the chemical predictors whose atmospheric concentrations are frequently found positively correlated with mortality rates are Sulfur dioxide, nitrogen dioxide, and particulate sulfate. Among frequently recurring negatively correlated predictors are copper, cadmium, and titanium. Evidence regarding whether SO2 and NO2 may be considered as mutagenic hazards to life is discussed, as are some potentially relevant biochemical functions of the metals. (Author abstract)
APTIC-25873

TESTS TO ASSESS EFFECTS OF LOW LEVELS OF AIR POLLUTANTS ON HUMAN HEALTH.

Arch. Environ. Health, 21 (4):553-558, Oct. 1970.
43 refs.
Benjamin G. Ferris Jr.
Identifiers: *Epidemiology, *Research methodologies, Humans, Mortality, Diagnosis, Nervous system, Blood pressure, Pulmonary function, Statistical analyses, Carbon monoxide.

Tests and techniques for assessing the effects of low levels of pollution on human health are reviewed. Attention is called to the more productive methods and to studies needed to determine the sensitivity and specificity of methods. For mortality studies to be effective indicators of pollution effects, more sophisticated statistical analyses must be employed. For subjective methods such as questionnaires to be effective, standardization is required. Among objective methods of testing pulmonary function, the failure rate is extremely low with spirometry, volume-flow, peak flow, or oscillating resistance. Methods of testing blood pressure must be standardized. Hair and nail clippings can be analyzed to obtain accurate estimates of exposure to a variety of substances. Attempts should be made to verify Russian studies indicating sensory and other neurological changes resulting from low levels of pollution and changes in tone discrimination induced by shore exposures to carbon monoxide.
APTIC-25874

INCIDENCE OF CHRONIC BRONCHITIS AND OF RESPIRATORY INSUFFICIENCY IN AN INDUSTRIAL RURAL POPULATION.

(Prevalence des bronchites chroniques et des
insuffisances respiratoires dans une population
industrielle d'habitat rural). Text in French. Bull.
INSERM, 25 (2):165-188, 1970. 7 refs.
P. Freour, and P. Coudray.
Identifiers: *Bronchitis, *Non-urban areas, *Paper manufacturing, Chronic, Humans, Health statistics, Morbidity, Occupational health, Respiratory functions, Smoking, Limestone, France, Industrial areas, Dusts.

The incidence of chronic bronchitis and of respiratory insufficiency was studied in 1011 employees of a cellulose plant (including 874 manual workers and 86 administrative workers; 724 were smokers) situated in a rural area near Bordeau by means of a questionnaire of the British Medical Council and by medical examination for symptoms of respiratory impairment. Major symptoms were found in 7.9% and minor symptoms in 23.44% of the work force; the incidence increased with age. The incidence of major symptoms among manual workers was 8.46% and among administrative workers, 5.81%. The difference between the incidence of symptoms of workers exposed to lime dust and to humid vapors and those not so exposed was not statistically significant. Smoking did affect the incidence significantly. Of smokers, 9.11% manifested major symptoms as against 4.18% in non smokers; 38.25% smokers manifested minor symptoms as against 23.34% in non smokers. A comparison of these figures with respective values of a similar study involving an urban industrial population group (Bordeau) reveals that the incidence of broncho-respiratory symptoms among the urban group is significantly higher which can be ascribed to a difference in life style and to air pollution.
APTIC-25875

EXPERIMENTAL STUDIES OF INHALED MATERIALS. A BASIS FOR RESPIRATORY MODELS.

Arch. Internal Med., 126 (3):466-470, Sept. 1970.
36 refs.
Paul E. Morrow.
Identifiers: *Deposition, *Retention, *Mathematical modeling, Laboratory animals, Humans, Respiratory system, Lung clearance, Aerosols, Dusts, Particle size, Simulation.

Recent technological advancements and newly available radioactive, isotopic aerosols have accelerated and broadened experimental investigations of dust deposition and retention in the human respiratory system. Collectively, these studies have provided a much improved basis for designing respiratory models of interest and value to biomedical research, and particularly to environmental scientists, occupational hygienists, and health physicists. These models are chronologically reviewed, and some recent information which appears to correlate deposition and clearance to measurements of the inhaled aerosol in the human subject is included. Deposition and especially retention studies in man are still in a developmental status. Quantitative deposition studies of submicron particles are required. Experimental methods involving the use of the human subject as his own control should make it possible to judge the actions of inhaled therapeutic or noxious agents with great reliability. (Author abstract modified)
APTIC-25883

THE EFFECT OF HEAT TREATMENT ON THE STRUCTURE OF KAOLIN AND ITS IN VITRO HEMOLYTIC ACTIVITY.

Environ. Res., 3 (3):187-198, July 1970. 7 refs.
S. Manyai, J. Kabai, J. Kis, Eva Suveges, and M.
Timar.
Identifiers: *Hematology, *Blood cells, *Clay, *Temperature, Europe, Dusts, Aluminum compounds, Aluminum oxides, Silicon dioxide, Crystal structure, Density, Surface properties.

Powders of water-cleaned white kaolin were heated at different temperatures (200, 350, 500, 650, 800, and 950 C). Changes in the internal structure of kaolin (density and crystal structure) and surface properties (specific surface area, immersion heat, and methylene blue adsorption) were investigated and compared with alterations of the in vitro hemolytic effect--a model of cell damaging effect--of kaolin dusts. Complete dehydration of kaolinite crystals into metakaolinite between temperatures of 500 and 650 C was accompanied by complete loss of hemolytic activity. When heating was carried out at higher temperatures, 800 or 950 C, the hemolytic effect became more intensive again, as gamma-aluminumoxide (or mullite) and silicon dioxide (cristobalite) were formed from metakaolinite. Of the surface properties studied, only methylene blue adsorption was directly correlated with the hemolytic activity. The extent of hemolysis caused by kaolin samples heated at different temperatures depended on the crystal structure and hydration of the surface. (Author abstract modified)
APTIC-25891

TETRAMETHYLLEAD AS SUBSTITUTE FOR TETRAETHYLLEAD.

Arch. Environ. Health, (8):296, Feb. 1964. 1 ref.
(Presented at the Charles F. Kettering Research Lab., Lead Symposium, Cincinnati, Ohio, Feb. 25-27, 1963.)
Robert A. Kehoe.
Identifiers: *Tetramethyl lead, *Occupational health, Gasolines, Tetraethyl lead.

The projected substitution of tetramethyllead in whole or in part for tetraethyllead in the compositon of antiknock compounds for use in motor gasoline presented a potential hazard to the handlers and users of such gasoline. Results of a preliminary investigation demonstrate that no significant hazard has been introduced by the use of tetramethyllead. A further survey was conducted subsequent to this compound going into commercial use, bu the results are not discussed here.
APTIC-25944

THE EFFECTS OF THE ABSORPTION OF FLUORIDE. V. THE CHEMICAL DETERMINATION OF FLUORIDE IN HUMAN SOFT TISSUES FOLLOWING PROLONGED INGESTION OF FLUORIDE AT VARIOUS LEVELS.

A.M.A. Arch. Ind. Health, 21 (4):330-332, April 1960. 2 refs.
Frank A. Smith, Dwight E. Gardner, Nicholas C. Leone, and Harold C. Hodge.
Identifiers: *Fluorides, *Absorption, *Tissues, Humans, Age, Autopsy, Circulatory system, Blood vessels, Heart, Liver, Kidneys, Lungs, Ingestion.

Fluoride levels were determined in human heart, liver, lung, kidney, spleen, and aorta taken from 23 autopsies. With the exception of the aorta, no tissue had accumulated fluoride to any degree, and there was no indication of fluoride increasing with increasing concentration of fluoride in water. The levels of concentration of fluoride in the aorta correlated well with age; the concentration increased with increasing age. The increase of fluoride in the aorta with age may be associated with the increase in calcification in this tissue with advancing age.
APTIC-25946

NITROGEN DIOXIDE AND LOWER RESPIRATORY ILLNESS.

In: Preventive Medicine. D. W. Clark and B. MacMahon (eds.), London, J. and A. Churchill Ltd., 1967, p. 491-498. 13 refs.
Martin E. Pearlman, John F. Finklea, John P. Creason, Carl M. Shy, and Marion M. Young.
Identifiers: *Respiratory diseases, *Nitrogen dioxide (no2), Questionnaires, Children, Infants, Age, Epidemiology, Bronchitis, Pneumonia, Non-urban areas, Industrial areas.

Bronchitis, croup, and pneumonia were compared in retrospect for children residing in areas with varying degrees of nitrogen dioxide pollution. Three areas were chosen to represent a pollutant gradient on the basis of aerometric, meteorologic, and topographic data; these consisted of a high NO2 exposure area surrounding an ammunition plant in Tennessee, and intermediate areas seven miles southwest of the plant, and a low NO2 exposure area located across a river from the plant. The age groups contacted in each area were the first and second graders in public and elementary schools and all white infants born during 1966, 1967, and 1968. Parents of infants were contacted by mail, and each school child took home a questionnaire and an explanatory letter. Hospital records were searched to verify all reported admissions, and physicians' records were reviewed to validate 14% sample of questionnaire responses. Only 4.4% of infants and 4.6% of school children reported an episode of pneumonia, ranging from 1.3% of those exposed 1 year to 3.3 and 7.4% of those exposed 2 and 3 years. More infants, 18%, than school children, 14%, reported at least one croup episode. No significant area differences were found in the proportion of children reported to have croup or pneumonia. Twenty-eight per cent of shool children reported one or more episodes of bronchitis as compared to 36% of infants. Again, older infants were more frequently affected, and one or more episodes of bronchitis were reported significantly more often by school children residing for 2 and 3 years in the high and intermediate NO2 areas. This pattern was not consistent for infants. Fourteen percent of school children and 17.3 percent of infants had repeated bronchitis.
APTIC-25966

IDENTIFICATION OF METABOLITES OF BENZO (A)PYRENE PRODUCED BY CELLS FROM HAMSTERS SUSCEPTIBLE TO CHEMICAL CARCINOGENESIS.

In: Project Clean Air. California Univ., San Francisco, Cancer Research Inst. and California Univ., San Francisco, School of Pharmacy, California Univ. Res. Proj. S-9, 14p., Sept. 1, 1970. 6 refs.
Ronald E. Rasmussen, and Neal Catagnoli.
Identifiers: *Cell metabolism, *Benzo (3-4)pyrene, Hamsters, Rats, Cells, Liver, Enzymes, Nucleic acids, Lungs, Tissues, Carcinogens, Chromatography, Benzopyrenes.

The carcinogenic action of benzo (a) pyrene (BaP) is known to be related to its ability to bind irreversibly to DNA, with the binding requiring activation of the hydrocarbon through metabolic transformation, photochemical excitation, or chemical oxidation. To better understand the relationship of microsomal oxidations and the DNA binding of BaP, a study was initiated of the comparative metabolism of BaP by microsomal preparations obtained from various tissues and cell lines. So far, microsomal enzyme preparations from rat and hamster liver as well as from hamster lung tissues have been studied. Both thin layer chromatography and gas liquid partition chromatography are being employed to separate the various metabolic products isolated from incubation mixtures. Preliminary analysis of metabolic products of BaP in hexane extracts of the microsomal preparations from both lung and liver indicates the presence of at least four major metabolic products, two of which have been reported previously. The identity of the others is under investigation. The metabolite formed in the largest amount is probably 3-hydroxybenzo (a)-pyrene. A significant finding is that the spectrum of metabolic products differ between liver and lung preparations. This suggests that special metabolic processing may occur in the target organ.
APTIC-25968

PATHOBIOLOGY OF AIR POLLUTANTS.

Environ. Res., vol. 1:178-197, Oct. 1967. 102 refs.
Hollis G. Boren.
Identifiers: *Nitrogen dioxide (no2), *Synergism, *Sequence, Guinea pigs, Alveoli, Health impairment, Carbon black, Exposure methods.

Results of inhalation exposure of guinea pigs to carbon followed by nitrogen dioxide or to NO2 followed by carbon, are presented to exemplify both specific and general problems inherent in using animal systems to determine injurious effects of environmental agents. Inhalation of carbon alone is followed by a macrophage response. Subsequent exposure to NO2 results in lung destruction. Inhalation of NO2 followed by carbon gives a macrophage response of lesser degree. These findings are interpreted to mean that the sequence of exposure may determine a given response. The limitations of this study indicate the necessity of using approaches which control or measure multiple biologic factors operative at different levels of organization of diverse animal systems. (Author abstract)
APTIC-25971

ADAPTATION TO OZONE.

In: Project Clean Air. California Dept. of Public Health Berkeley, California Univ. Task Force Assessments, vol. 2, App.-I, 6p., 1970. 14 refs.
William J. Tuddenham.
Identifiers: *Adaptation, *Ozone, Acute, Laboratory animals, Morbidity, Mortality, Lungs, Toxic tolerances, Pulmonary edema.

Toxicologic studies on animals of the acute effects of repeated exposure to ozone have demonstrated the condition known as tolerance, or adaptation. In these experiments, the survival rate is greater among previously exposed animals than among those which are exposed only to a lethal dose. Preexposure to low doses of one agent gives some protection against the effects of lethal doses of others. The common effect of these agents is production of pulmonary edema. The possible implications of these animal studies for the question of development of the tolerance phenomenon in humans is discussed. Tolerance may affect some response to low and high levels of some pollutants, but not all species can develop tolerance. Present knowledge is not sufficient to indicate whether humans have that capability.
APTIC-25986

AN EVALUATION OF THE ROLE OF NITROGEN DIOXIDE IN THE DEVELOPMENT OF RESPIRATORY DISEASES IN MAN.

In: Project Clean Air. California Univ., Davis, California Univ. Task for Assessments, vol. 2, App.-J, 27p., 1970. 79 refs.
Elliot Goldstein.
Identifiers: *Pulmonary resistance, *Respiratory diseases nitrogen dioxide (no2), Acute, Chronic, Laboratory animals, Humans, Alveoli, Toxicity, Respiratory diseases, Oxidants, Nitrogen dioxide (no2), Oxidation, Free radicals.

Present knowledge of the relationship between exposure to nitrogen dioxide and respiratory disease is reviewed. Several conclusions are drawn from various human and animal studies: exposure of man and experimental animals to very high NO2 level results in significant pulmonary pathology; exposure to ambient levels of NO2 is not associated with disease; and extrapolation to man from data obtained using animal models is not warranted. The possible effects of NO2 on the lowering of pulmonary resistance to infection, on mucociliary function, and on alveolar macrophage function are discussed. Subjects for future research are suggested, including investigation of the hypothesis that some of the toxic effects of NO2 are due to biological oxidation and resultant free radical formation, and the possibility of pretreatment with high levels of anti-oxidants such as vitamins E and C.
APTIC-25987

PHYSIOLOGIC PROCESSES IN ABSORPTION OF POLLUTANTS.

Arch. Environ. Health, 8 (1):77-85, Jan. 1964. 11
refs. (Presented at the Air Pollution Medical
Research Conference, 6th Annual, San Francisco,
Calif., Jan. 28-29, 1963.)
Marvin Becaner.
Identifiers: *Metabolism, *Pollutants, *Absorption, Humans, Carboxyhemoglobin, Hemoglobin interactions, Blood cells, Excretions, Alveoli, Skin, Ingestion, Respiratory functions, Oxygen diffusion, Particle size, Arsenic compounds, Carbon monoxide, Reaction kinetics, Reaction mechanisms.

The major factors that determine the body burden of absorbed pollutants involve the chemical nature, the size and the physical state of the material involved, the portal of entry into the body, the chemical and physical interaction within the body tissues themselves, utilization and damage or interference with normal mechanisms, and the excretion from the body either of the original product or of metabolites. Pollutants may enter by absorption through the skin, inhalation, or ingestion, and the mechanism for these methods of entry are reviewed. Th.. Fick diffusion equation is provided, and the kinetics of absorption and the body distribution of pollutants are discussed. The rate of uptake of carbon monoxide by blood depends on both the partial pressure of CO in the inspired air and alveolar ventilation. Carbon monoxide has a great affinity for hemoglobin with which it combines to form carboxyhemoglobin. Arsenic is almost entirely carried by red blood cells in chemical complex with globin. Several other compounds and their metabolism are also reviewed.
APTIC-25988

THE PUBLIC HEALTH SIGNIFICANCE OF ATMOSPHERIC LEAD.

Arch. Environ. Health, vol. 3:568-574, Nov. 1961.
14 refs.
D. H. Hofreuter, E. J. Catcott, R. G. Keenan, and
C. Xintaras.
Identifiers: *Hematology, *Urinalysis, *Lead compounds, Age, Males, Females, Occupational health, Smoking, Thresholds, Metal poisoning, Non-urban areas, Urban areas, Automotive emissions.

Approximately 1000 human blood samples and 250 urine specimens were collected and analyzed for lead content during the past year. The samples were obtained in 6 major cities and 1 rural area in the United States; the analyses for lead were done at one U. S. Public Health Service laboratory employing the U.S.P.H.S. Method for Lead. Data from the subjects were grouped to provide comparison of the lead levels on the basis of geographic location, sex, occupational exposure to lead, age, and smoking habits. Highly significant differences were observed when blood lead concentrations were compared for urban and rural groups and for smokers and non-smokers. Higher blood and urine lead levels also were detected consistently among workmen exposed to unusual quantities of vehicular exhaust in their customary working environment. Finally, these surveys demonstrated the existence of significantly higher blood lead levels among men than among women, none of whom were occupationally-exposed to lead. Although significant differences were found between various classifications, the mean values for each group were within the recognized normal range of lead concentrations. Not a single value exceeded the accepted high normal limit of 0.07 mg per 100 gm of whole blood. (Author summary)
APTIC-25991

POSSIBLE EFFECTS OF AIR POLLUTION ON THE COURSE OF INFECTIOUS RESPIRATORY DISEASE.

In: Project Clean Air. Washington Univ., Seattle,
School of Public Health and Community
Medicine, California Univ. Task Force
Assessments, Vol. 2, App.-C, C1-C15, 1970. 58
refs.
James McCarroll.
Identifiers: *Epidemiology, *Respiratory diseases, *Meteorology.

The vast majority of epidemiological studies of many disparate populations have shown some evidence of a relationship between both the incidence and prevalence of acute respiratory infections and elevated air pollution. The relationship is of low degree, but the consistency of the findings would seem to make them suitable as a basis for air pollution control policies, especially when combined with the numerous other suggestive health effects of air pollution indicated by other types of studies. Further, even the very small percentage of all acute respiratory infections that can be attributed to air pollution represents a tangible and significant dollar loss to a community. All studies considering meteorologic factors agree that weather plays a far more important role in both incidence and prevalence of acute respiratory disease than does air pollution. (Author summary modified)
APTIC-25999

STATE OF THE ART.

In: Project Clean Air. California Univ., Berkeley,
Task Force 2, Vol. 2, Section 2, p. 2-1 to 2-40,
1970. 178 refs.
Personal Author Not Recorded.
Identifiers: *Pulmonary function, *Respiratory diseases, Humans, Epidemiology, Nervous system, Lung cancer, Eye irritation, Health impairment, Combustion products, Smog.

The biomedical effects of air pollution are evaluated from epidemiologic evidence and from experimental studies of known single components and of crude natural or simulated pollutions. Human hazards in particular are reviewed from the standpoint of epidemiologic and experimental studies under laboratory circumstances. Emphasis is laid on effects due to pollution by fossil-fuel combustion with production of primary pollutants and photochemical smog. The hazards noted include lung cancer, respiratory diseases, eye irritation, cardiac effects, psychomotor effects, and effects on pulmonary function.
APTIC-26000

BRONCHIAL CANCER IN THE IRON MINER OF THE LORRAINE BASIN. (BASED ON 225 OBSERVATIONS).

(Le cancer bronchique chez le mineur de fer du
bassin de Lorraine. (A propos de 225
observations). Nancy Univ. (France), Faculte de
Medecine, Thesis (M.D.), March 4, 1964, 194p. 229
refs. Translated from French. 65p.
Yves Kessler.
Identifiers: *Bronchial cancer, *Iron, *Mining, Humans, Age, Epidemiology, Morbidity, Occupational health, Pathological techniques, Drugs, Smoking, Synergism, Lung cancer, Asbestos, France, Coal tars, Dusts, Arsenic compounds, Hydrocarbons, Chromium compounds, Nickel compounds, Carbon monoxide, Nitrogen oxides, Sulfur oxides, Radioactive radiation.

A study of the incidence and possible causes of lung cancer in iron miners is presented. Two series of subjects are statistically compared: 225 iron miners with bronchial cancers, and 850 subjects from different professions with bronchial cancers. Relationships involving age, smoking habits, alcohol use, and atmospheric pollution of the living environment are derived. The working conditions of the miner's are investigated, and potentially harmful dusts and gases are studied, including carbon monoxide, nitrous vapors, sulfur vapors, and hydrocarbons. Dangerous substances in the non-mining professions include ionizing radiation, asbestos, chromium, nickel, arsenic, and coal. Anatomical and pathological aspects of the two occupational group's cancers are compared; therapeutic methods are considered; evolution of the disease is discussed; and etiopathogenic deductions are made concerning the causes of the cancer.
APTIC-26001

STUDIES ON MASS EXAMINATION BY INTRADERMAL REACTION AGAINST HOUSE DUST EXTRACT AMONG SCHOOL CHILDREN IN THE AIR POLLUTED AND UNPOLLUTED AREA. REPORT II. RELATIONS BETWEEN THE INTRADERMAL REACTION AND INFLUENCES OF AIR POLLUTION ON THE HUMAN BODY.

Text in Japanese. Yokohama Igaku (Yokohama
Med. J.), 21 (2):201-212, June 1970. 38 refs.
Toyotsune Tsugane.
Identifiers: *Respiratory functions, *Allergies, *Pollutants, Children, Respiratory diseases, Japan, Urban areas, Dusts.

An investigation was undertaken to clarify the relation between results obtained from an intradermal reaction to house extract (H.D.) and the influence of air pollution on school children. Intracutaneous injection of 1:1000 and 1:8000 dilution of H.D. was made with children from both a polluted and unpolluted area. Then, the relation was examined among results obtained by this reaction, occupation of the children's father, subjective respiratory symptoms, peak expiratory flow rate, one second vital capacity rate and vital capacity rate. A positive intradermal reaction against H.D. was found to be higher with both 1:1000 and 1:8000 dilution among school children from the polluted area. Also, those children from the polluted area with a positive intradermal reaction possibly had more respiratory symptoms and a lower vital capacity rate than those with a negative reaction. It is presumed that school children with an allergic constitution are more sensitive to influences of air pollution. As the peak expiratory flow rate of school children in the air polluted area is lower than that for the children in the unpolluted area, an obstructive ventilatory disturbance is considered to exist. (Author abstract modified)
APTIC-26004

EFFECT OF AIR POLLUTION ON THE INHABITANTS IN OMUTA WITH SPECIAL REFERENCE TO THE FINDINGS OF LUNG FUNCTION AND CHEST X-RAY FILM.

(Omuta Shimin ni oyobosu taikiosen no eikyo.
Toku ni hai kino, kyobu ekkususen shoken ni
tsuite). Text in Japanese. Saigai Igaku (J.
Accidental Med.), 11 (9):917-932, Aug. 1970. 16
refs.
Seiya Yamaguchi, Yo Ono, and Hisao Matsumoto.
Identifiers: *Radiography, *Pulmonary function, *Epidemiology, Monthly, Children, Age, Males, Females, Japan, Urban areas, Dust fall, Soot fall, Sulfur trioxide.

As a part of the second Omuta City epidemiological investigation of the influence of air pollution in August 1966, thoracic x-ray examination was done on the 2626 residents who live in the contaminated area and in the control non-contaminated area. Examination of pulmonary function was done by Peak-Flow-Meter and Vitalor on the 520 school boys and 527 school girls (aged 8-12), and the 1104 mothers (aged 24-55) of the school children, who lived in the present addresses for more than five years. The monthly average of falling soot and dust and sulfur trioxide concentration in all of the area were 26.5 t/sq km/month, and 0.76 mg/D/100 cu cm PbO2. Thoracic x-ray examination revealed tuberculous changes at a higher rate of 7.5% in the contaminated area and 4.2% in the non-contaminated area. The average of the mothers' vital capacity was higher in the control area; the ratio which did not reach 80% in the percentage of the estimation was more or less higher in a part of contaminated area. The average of PFR showed obviously a low figure in a part of the contaminated area. In the comparison of PFR by height, it was at the lowest in a part of the contaminated area and higher in the non-contaminated area. The average figure of vital capcity in school children, both of boys and girls, showed a tendency to be smaller in the contaminated area. It did not always show the parallel relation with air pollution. PFR in boys showed a higher figure in the contaminated area, and the regression line of PFR against the vital capcity showed a slight difference in the low vital

capacity group; the higher the vital capacity, the lower was the PFR in the contaminated area. The average of 0.5 second amount figures by height and figures by height with MEFR in boys were higher in the non-contaminated area. From the result of this investigation, the mothers' PFR, school children's PFR, 0.5 second amount, and the expired air flow shown in MERF were reduced in the contaminated area.
APTIC-26024

THE INFLUENCE OF AIR POLLUTION ON RESPIRATORY APPARATUS OF THE INHABITANTS OF BOTH OTAKE AND KURE CITIES.

(Otake, Kure ryoshi ni okeru taikiosen no kokyuki ni oyobosu eikyo). Text in Japanese. Hiroshima Igaku (J. Hiroshima Med. Assoc.), 23 (10): 833-842, Oct. 1970. 9 refs.
Personal Author Not Recorded.
Identifiers: *Epidemiology, *Respiratory diseases, Diurnal, Monthly, Adults, Age, Males, Females, Pulmonary function, Smoking, Asthma, Bronchitis, Cough, Japan, Urban areas, Dust fall, Soot fall, Sulfur trioxide.

An investigation area of (1) heavy pollution with an average sulfur trioxide concentration of 0.60 - 0.9 mg/day/100 sq cm PbO2, and an average falling soot and dust concentration of 5.81-39.48 t/sq/km/month and a (2) control area of mild pollution with an average SO3 concentration of 0.38 - 0.59 mg/day/100 sq cm PbO2 and average falling soot and dust concentration of 7.79 t/sq km/month were selected for study in November 1969. Interviews and questions using a BMRC questionnaire and simple pulmonary function tests using vitalor were made for the 290 inhabitants who were chosen at random from the men or women more than forty years of age and lived in the areas. There were 93.3% inhabitants who lived at the present address for more than five years; 98.6% of them answered the questionnaire. Cough, sputum, short breath, rest because of respiratory disease, and bronchitis showed generally a high rate; compound symptoms showed a low rate. Men showed a higher rate in almost all items except short breath than women, but no significant difference was found. Although there was no significant difference between the areas, both men and women in the investigation area showed a higher rate than the control area in cough at day or night, acute increase of cough and sputum, rest because of respiratory disease, bronchitis, and respiratory asthma. The relation between respiratory symptoms and smoking was studied only in men. The smokers showed a higher rate than non-smokers or former smokers in continued sputum and short breath of more than grade three, and in compound symptoms except cough; but there was no significant statistical difference and no obvious difference between areas. In the simple pulmonary function test, only 2.2% of subjects showed an abnormal figure where less than 60% of the rate for one second was abnormal; no significant difference could be found between areas. Although the influence of air pollution is obscure at present, the result suggest that a slight influence begins to appear.
APTIC-26025

ON RELATIONSHIP OF CHRONIC RESPIRATORY DISEASES TO AIR POLLUTION.

(Mansei kokyuki shikkan to taikiosen tono kankei). Text in Japanese. Saigai Igaku (J. Accident Med.), 11 (9):903-916, Aug. 1968. 16 refs.
Nanio Saruta, Noburu Ishinishi, Yasushi Kodama, and Eizaburo Kunitake.
Identifiers: *Respiratory diseases, *Urban areas, Questionnaires, Age, Females, Smoking, Japan, Industrial areas.

For the analysis of the relationship of chronic respiratory diseases to air pollution, a questionnaire on sputum, cough, and stridor was utilized according to the standards of the questionnaire by the British Medical Research Council. A personal interview was conducted for all of the women who were more than 40 years old, and had lived in Sanroku, Tobataku, and Nakahara areas which were high air pollution areas in Kitakyushu city and for others who had lived in Kotobukiyama, Ashihara, and Kirigaoka in Kokuraku which were low air pollution areas. There were 3251 and 2197 inhabitants in the areas; a comparison of the symptoms in each area was made during the period of July 15 to 31, 1966. The return rates to the questionnaire were 82.28% in Tobataku and 84.73% in Kokuraku. The symptoms were divided into light, medium, and strong; they were twice as many in Tobataku inhabitants as in Kokuraku ones. But there was no difference in the symptoms according to the living years. Smokers showed higher rates in symptoms than non-smokers or previous smokers; but the symptoms in Tobataku, in spite of the non-smoking, smoking, or previous smoking, were twice as high as that in Kokuraku. The past and present occupational history or harmful occupational history did not especially contributed to the chronic respiratory symptoms. Furthermore, there were no significant differences in the symptoms by educational histories or amounts of income. Although the tests of anamnesis, present status, blood pressure, general condition, and sputum were made for the persons with symptoms, these results were not mentioned in this investigation.
APTIC-26032

SMOG AND RICKETS.

(Sumogu to Kurugyo). Text in Japanese. Shonika Rinsho (Japan J. Pediat.), 23 (8):992-998, Aug. 1970. 18 refs.
Uruno Katsumasa.
Identifiers: *Rickets, *Smog, Seasonal, Infants, Treatment and aids, Radiography, Diseases and disorders, Tokyo, Urban areas, Sulfur dioxide.

The relation between smog and rickets in three or four-month-old babies was studied from the result of their medical examination at Kojiya Health Center, Otak-ku, Tokyo. The cotyloid concavity in the far-edge of the ulna by x-ray examination was defined as a rachitic change. The concavity rate is different by year, but the change in the bone was recognized at the rate of 3-13% in March and April of each year. It had no tendency to increase by the year. The result of medical examinations in summer showed a very low rate in 1965, but it increased later and showed about the same rate as that in early spring examinations. This is characteristic of the Kojiya area. The examination was made throughout the year in 1968 and 1969, but a seasonal difference was hardly noticed. The relation between the decrease of ultra-violet rays and rachitic change was not proved positively, but the concentration of sulfur dioxide in this area has increased not only in winter but also in summer lately. Bathing in the sun must be carried out strictly for more than thirty minutes a day throughout the year for the prevention of infantile rickets. By continuing it, rickets can be satisfactorily prevented.
APTIC-26033

RECENT RICKETS IN INFANTS OF TOKYO METROPOLIS.

(Saikin ni okeru Tokyo-to-nyuji no kurubyo ni tsuite). Text in Japanese. Shonika Rinsho (Japan J. Pediat.), 22 (3):313-337, March, 1969. 3 refs.
Uruno Katsumasa, Kazuo Tsuchida, and Kazue Watanabe.
Identifiers: *Rickets, *Tokyo, Seasonal, Infants, Radiography, Diseases and disorders, Urban areas, Dusts, Sulfur dioxide, Solar radiation, Ultraviolet radiation.

X-ray examinations for rickets were performed on infants aged three-four postnatal months who live within the province of Kojiya Health Center, Ota Ward, which is considered to be one of the highly polluted districts in Tokyo. Its relation to the amount of ultra-violet rays and the effectiveness of sun bath was discussed. The articular area of the right hand was x-rayed and cup-shaped deformations of the distal end of the ulna were determined to be of the concave type. The incidence rate of the concave type was 3.2-12.8 % at the time of examinations performed in the spring of 1964-1968. Although it was 0.7% in the summer examination of 1965, it rose to 12.5 and 11.4% in 1966 and 1967, respectively. Thus, differences according to season disappeared. This change was similarly observed in types that were healed. No significant relationship was observed between the incidence of concave type and sex distinction, the length of gestation, birth weight, growth conditions of height and weight, Caup's index, the condition of streaming of the sun into the nursery, and nutritional conditions. Concave type was the highest among infants who were not exposed to the sunlight at all, regardless of the season; it was not observed in the group who had a sun bath for longer than 30 minutes. No significant difference was noted between the group with no exposure to the sunlight and the group with insufficient sun bath. The relation of the amount of intake of vitamin D and the extent of sun bath of purely artifically fed infants to the incidence of concave type was examined; it broke out in a considerable number of infants who took 1000 units of vitamin D. On the other hand, when sun bath was carried out strictly for more than 30 minutes per day, the concave type did not seem to occur even with a relatively small dose of vitamin D. The amount of ultra-violet rays in the pertinent area was reduced in winter by 20% of summer. On the contrary, sulfur dioxide and the volume of dust are considerably larger in winter. No evident correlation was observed between the amount of ultra-violet rays and the volume of dust and rickets of infants.
APTIC-26034

STUDIES ON THE RELATIONSHIP BETWEEN AIR POLLUTION AND INFANTILE ASTHMA ATTACKS. USING THE SO2 CONCENTRATION IN THE AIR AS AN INDICATOR.

(Taikiosen to shonikikanshi zensoku hossa no kanren--taikichu SO2 nodo o shihyo to shite). Text in Japanese. Shonika Rinsho (Japan J. Pediat.), 23 (8):983-990, Aug. 1970. 18 refs.
Zengi Yoshida, Yuichiro Yamashiro, Yoshinobu Maejima, and Tetsuo Kubakawa.
Identifiers: *Infants, *Asthma, *Sulfur dioxide, Alerts, Monthly, Morbidity, Tokyo, Urban areas, Smog, Air quality measurements.

In order to study the relationship between sulfur dioxide concentrations in the air and attacks of asthma, 107 cases of the out-patients with asthma at the clinic of allergy in the department of pediatrics of Juntendo Hospital were studied throughout 1968. Sulfur dioxide concentrations were investigated according to the results of the measurements of air pollution made by an auto recorder reported by the Bureau of Capital City Development (published in March 1969). The frequency of the attacks of asthma was studied on the basis of hospital cards and diaries recorded by the patient's family. The relationship of SO2 concentrations and attacks of asthma in the following four divided areas was summarized on a monthly basis: (1) Koto-ward, (2) Edogawa-ward, (3) Chiyoda, Chuo, Bunkyo, Daito, Shinjuku, Koto, Minato and Shinagawa wards, and (4) Setagaya, Itabashi, and Edogawa wards. No correlation was found. The results did not indicate that SO2 concentrations in the air were high when attacks were frequent or that more attacks occurred on the days when SO2 concentrations were high. Thirty three cases of infants living in Chiyoda, Chuo, Bunkyo, Daito, Shinjuku, Koto, Shinagawa, and Minato wards where SO2 concentrations were thought to be comparatively high were investigated on a day when a warning against smog was announced or on the following day. No tendency for attacks of asthma to occur more frequently on those days were noticed.
APTIC-26051

STUDIES ON RESPIRATORY TRACT DISEASES CAUSED BY AIR POLLUTION --SUR-

VEY OF PUBLIC NUISANCES GRANT BY THE HEALTH AND WELFARE MINISTRY, IN 1967.

(Taiki osen ni yoru kokyuki shikan ni kansuru
kenkyu--Showa 42 nendo Koseisyo kogai chosa
kenkyu itaku). Text in Japanese. Nippon Ishikai
Zasshi (J. Japan. Med. Assoc.), 61 (7):805-835,
April 1969.
Ishikai Yokaichi.
Identifiers: *Respiratory diseases, *Industrial areas, Chronic, Monthly, Age, Males, Females, Morbidity, Asthma, Bronchitis, Emphysema, Japan, Petroleum refining, Statistical analyses.

Results of a survey on respiratory tract diseases affected by air pollution in oil combine in Yokkaichi City, Mie Prefecture consisted of the following two points: (1) statistical survey of some obstructive respiratory tract disease by regional group and month (bronchial asthma, chronic bronchitis, pulmonary emphysema, and asthma-like bronchitis) which were diagnosed by members of the Medical Association in Yokkaichi City; and (2) actual conditions of the disease which were recognized as caused by air pollution by medical centers of Yokkaichi City and the Medical Association. Survey included the following seven points, conducted in January, May, and August in 1967: (1) number of medical institutions where the survey was conducted; (2) the survey of chronic obstructive pulmonary diseases; (3) occurrence rate of patients by clinics; (4) distribution of patients by residence; (5) classification of patients by regional groups; (6) age distribution, and (7) ratio of men and women who were older than 55 years of age and younger than 10. Results were described in figures and tables; in this report, data are interpreted but not analyzed. Survey (2) reported the number of patients who were recognized by medical centers of Yokkaichi City Medical Association, the number of patients who consulted at medical centers, and the number of patients who underwent physical examination for respiratory tract diseases in a period from June 1967 to March 1968, at the Medical Center of Yokkaichi City. These results were shown in tables classified by residential areas, age, and sex. Analysis is presented of 65 cases of patients who were older than 16 with special reference to chronic obstructive pulmonary disease, a case of Yokkaichi asthma (male, 64 years) is presented.
APTIC-26053

PREVALENCE OF RESPIRATORY SYMPTOMS AND PEAK FLOW RATE OF THREE YEAR OLD CHILDREN.

(Sansaiji no kokyukishojo yushoritsu to
pikufrochi). Text in Japanese. Nippon Koshu Eisei
Zasshi (Japan. J. Public Health), 17 (7):375-381,
July 15, 1970. 4 refs.
Jun Kagawa, Toshio Toyama, Hisayuki Ishida,
and Hidehiko Nakajima.
Identifiers: *Children, *Pulmonary function, *Industrial areas, Questionnaires, Japan, Non-urban areas, Flowmeters.

Data on the prevalence of respiratory symptoms and peak flow rate for 254 three-year-olds in a polluted area (Kawasaki) and 132 three-year-old children in a control area (Yamato, Kanagawa Prefecture) are presented. Modified British Medical Research Council questionnaires were directed to mothers to ask about respiratory symptoms of their children. A low-range Wright peak-flow meter was used to assess pulmonary function. In the present preliminary report, emphasis was placed on the usefulness of the above methods. No problems were found when the methods were used with care. Some significant differences were found in the prevalence of respiratory symptoms and in the incidence of respiratory diseases among the two different communities. There was a significant linear relationship between physical height and peak flow rate, but there were no significant differences in the polluted and control areas in the peak flow rates adjusted by physical height.
APTIC-26089

INTRATRACHEAL ADMINISTRATION OF DUST PARTICLES AND CARCINOGENS IN RATS.

In: British Empire Cancer Campaign 46th Annual
Report, p. 108-109, 1968.
F. Dickens, H. B. Waynforth, and R. Parkin.
Identifiers: *Dusts, *Trachea, *Carcinogens, *Tumors, Rats, Great britain, Benzenes, Benzopyrenes.

In a brief account of intermediate results, abdominal metastases of an unknown primary tumor is reported in one rat to date (90 weeks) of a group of six treated intratracheally with a suspension of small atmospheric dust particles in arachis oil, and a metastasized tumor of the thymus was found in one rat given a petroleum ether (benzene) methanol extract of this dust. No tumors have appeared in rats given arachis oil alone or in those given benzopyrene either alone or in combination with dust particles.
APTIC-26099

STUDY OF PULMONARY DUST DEPOSITS WITH ELECTRON MICROSCOPE AND MICROANALYSIS WITH AN ELECTRONIC PROBE.

(Etude de l'empoussierage pulmonaire au
microscope electronique et au micro-analyseur a
sonde electronique). Text in French. Presse Med.
(Paris), 78 (37): 1627-1628, Sept. 12, 1970.
R. Pariente, J.-P. Berry, P. Gal, E. Cayrol, and G.
Brouet.
Identifiers: *Silicon compounds, *Dusts, *Lungs, Humans, Pneumoconiosis, France, Electrical measurement devices, Electron microscopy.

The function of the ultrastructure of lung tissues, which normally contain a considerable amount of mineral substances, was investigated with the expectation of defining normal and abnormal mineral concentrations, especially of silicon. In patients with illnesses occurring in other parts of the body, it is possible to define certain dense zones in the interstitium, characterized by the fact that they are opaque, striated, and irregular, thought to be a modified elastin. Six patients with diffuse interstitial fibrosis were studied, and revealed the following common characteristics: proliferation of type II granulpneumocytes instead of type I, a large quantity of apparently elastic fibers instead of the normal hyperplastic elements, a considerable quantity of silicon and smaller excesses of some other minerals. The effect of elastase on these tissues was studied, and it was found that the abnormal areas were resorbed.
APTIC-26110

EFFECTS ON RAT OF CHRONC EXPOSURE OF LOW CONCENTRATION OF CO. PART I.

(Dobutsu ni taisuru biryo CO mansei bakuro
jikken. Dai-1-po). Text in Japanese. Taiki Osen
Kenkyu (J. Japan Soc. Air Pollution), 4 (1):125,
1969. (Proceedings of the 10th Annual Meeting of
the Japan Soc. Air Pollution, 1969.)
Hiroshi Watanabe, Hisako Murayama, Shigeo
Yamaoka, Osamu Fukase, and Shinto Chen.
Identifiers: *Foods, *Nervous system, *Metabolism, *Carbon monoxide, Maximum allowable concentration, Acute, Chronic, Rats, Pathological techniques, Tissues, Japan.

Animal experiments were conducted in order to examine the allowable concentration of carbon monoxide on the human body, the effects on the metabolism of vitamin B1, and the pathological change in the central nervous tissue. Rats were exposed chronically or acutely to 1000, 500, 100, and 30 ppm of CO. Growth of rats exposed to 500 ppm was lower than that of the control group, but one week after cessation of exposure, the difference was unnoticeable. For 100 and 300 ppm groups, there was no difference between those that were fed the normal diet and those that were fed the vitamin B1-deficient diet. The pathological diagnosis of the central nervous tissue showed that especially for 1000 and 500 ppm acute exposure groups, blood congestion had formed in various parts of the brain tissues and atrophycal deformations of nerve cells had taken place. Rats in the 500 ppm group were back to normal one month after cessation of the exposure experiment. Over 30 ppm CO affects the central nervous system.
APTIC-26113

THE STATISTICAL SURVEY ON UPPER RESPIRATORY REGION OF SCHOOLCHILDREN IN THE AIR POLLUTION AREA IN WAKAYAMA.

(Taiki osen chiku gakudo no biinkoto shoken ni
tsuite). Text in Japanese. Taiki Osen Kenkyu (J.
Japan Soc. Air Pollution), 4 (1):53, 1969.
(Proceedings of the 10th Annual Meeting of the
Japan Society of Air Pollution, 1969.)
Kazuko Handa, Kazuo Tamura, and Toshihide
Tabata.
Identifiers: *Wakayama, *Children, *Pulmonary function, Area surveys, Chronic, Morbidity, Skin tests, Respiratory system, Allergies, Respiratory diseases, Laryngitis, Japan, Breathing apparatus, Statistical analyses.

Two thousand four hundred ninety-five schoolchildren (1288 male and 1207 female) of the seven primary schools under the jurisdiction of Wakayama Municipal Health Service were subjected to pulmonary function test by a Vitalor and were also examined for upper tracheal afflictions. For those suspected of having nasal allergy, three types of skin tests were performed. Forty-eight percent of the children had enlarged tonsils, 25% granular laryngitis, 19% chronic laryngitis, 17% nasal catarrh, and 15% nasal allergy. In areas where the pollution is severe, the morbidity was higher for any illness compared to other areas, but the granular pharyngitis and chronic pharyngitis were fairly significant. On diagnosing the granular pharyngitis cases, the increase and the hypertrophy of the lymphatic nodules, and sometimes some pus in the central part of the nodules were observed, but there were no special profiles on the mucosa of the posterior wall or in the circulatory system.
APTIC-26114

EFFECT OF IN VITRO EXPOSURE TO O3 ON SURFACE TENSION OF LUNG EXTRACT.

(In vitro O3 bakuro ni hai chushutsuekito no
hyomen choryoku ni oyobosu eikyo). Text in
Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air
Pollution), 4 (1):128, 1969. (Proceedings of the 10th
Annual Meeting of the Japan Society of Air
Pollution, 1969.)
Eiji Yokoyama.
Identifiers: *Body fluids, *Lungs, *Ozone, *Surface properties, Dogs, Japan, Instrumentation, Surfactants.

Variation in the surface tension of a pulmonary extract solution of dog due to exposure to ozone was investigated. Surface tension was measured by modified Wilhelmy balance, and exposure to O3 was conducted by passing 1 l/min of O3 through a covered myographic force transducer. Rapidly after the start of the exposure at 0.55 ppm, within 1-3 periods, gamma minimum started to rise but tended to subside later. There was no change in gamma maximum. Synthetic DL-alpha-lecithin (DPL) showed the gamma minimum of below 10 dyne/cm and the hysterisis loop was also good, but there was no real change in the gamma maximum or minimum by exposure to O3. The fraction of pulmonary phospholipids showed the gamma minimum of 2 - 3 times the DPL value to 10 dyne/cm, but due to exposure to O3, gamma maximum tended to rise. The rise in the surface tension of the pulmonary extract under exposure to O3 involves the following mechanism. O3 does not react with the DPL, the main component of the surfactant of the extract, because C16-20 in DPL does not possess a double bond, but O3 reacts with the unsaturated fatty acid to form malonaldehyde.
APTIC-26115

SOME OBSERVATIONS ON ANIMALS EXPOSED TO AIR POLLUTANTS ESPECIALLY SULPHUR OXIDES.

(SO2 to no eikyo ni tsuiteno jakkan no dobutsujikkenkekka ni tsuite). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4 (1):127, 1969. (Proceedings of the 10th Annual Meeting of the Japan Society of Air Pollution, 1969.)
Katsumi Yoshida, Masayoshi Kitabatake, Hidehiko Oshima, and Masayuki Imai.
Identifiers: *Laboratory animals, *Respiratory diseases, *Nitrogen dioxide (no2), *Sulfur dioxide, Pathological techniques, Cilia, Bronchi, Lungs, Breathing, Japan.

A pathological investigation was conducted on laboratory animals concerning the effect of sulfur oxides. Inhalation of sulfur dioxide at the average concentration of 0.4 ppm for three months caused the rats to suffer the following symptoms. For the lungs as a whole, there were blood congestion, cell infiltrations in the interstices, and for the bronchial epidermis, there were loss of cilia, hypertrophy of goblet cells, and loss of the cellular components inside the intralamina. At the average daily concentration of sulfur dioxide at 1.47 mg/day, and 0.2 mg/day nitrogen dioxide, the rats raised in the animal shed in the Isozu area of Yokkaichi for six months showed the following symptoms: in the peripheral region, emphysemous change of alveoli, and inflammation foci at various locations in the lungs were observed; in the alveolar region, inflammation foci similar to chronic epidermal pneumonitis were found, and in the bronchial wall, damages to cilia, deformed vacuolization of ciliated cells, and increase in goblet cells were seen. For the rats that died within the period, the above symptoms were strong. Forty-five stray dogs caught in Yokkaichi were examined and relatively many cases of inflammatory changes, hypertrophy of alveolar wall, and increase in goblet cells in the bronchial wall were found. Loss of cilia, and in parts of epidermis, minor cell inflammation foci were observed in the bronchioles and alveolar passages.
APTIC-26116

THE EFFECT OF O3, NO2, AND SO2 EXPOSURE ON THE EXPERIMENTAL ASTHMA IN GUINEAPIGS.

(Morumotto no jikkenzensoku ni oyobosu O3, NO2, oyobi SO2 bakuro no eikyo). Text in Japanese. Taiki Osen Kenkyu (J. Japan Soc. Air Pollution), 4 (1):148, 1969. (Proceedings of the 10th Annual Meeting of the Japan Society of Air Pollution, 1969.)
Yukio Matsumura.
Identifiers: *Breathing, *Asthma, *Nitrogen dioxide (no2), *Sulfur dioxide, *Ozone, Guinea pigs, Antigens, Lungs, Trachea, Allergies, Japan.

Two experiments were conducted concerning the effects of ozone, nitrogen dioxide, and sulfur dioxide gases on the experimentally induced asthma of guinea pigs sensitized by egg-white and cow-serum albumin as sensitinogens. Exposure for 30 minutes in 5, 70, and 330 ppm of O3, NO2, and SO2, respectively, intensified the pertracheal sensitization due to inhalation of antigens. However, 10 ppm of O3 did not affect the sensitization by injection. In order to clarify the above mechanism, egg-white albumin was injected into the lungs through the trachea, and it was discovered that exposure to O3 promotes the absorption of, but delays the discharge of antigens by the lungs. When the guinea pigs sensitized continually by intraperitoneal injection were exposed to over 2 and 40 ppm of O3 and NO2, respectively and were made to inhale the aerosols of antigens 30 minutes later, the attacks were stronger for these guinea pigs than those unexposed, and the mortality due to dyspnea was also high. For SO2, even at 400 ppm, such reactions were not observed. The O3 and NO2 were quite low in concentration, and it is notable that they nevertheless contributed greatly to the occurrence of allergic dyspneal attacks.
APTIC-26117

PRESENT SITUATION AND OUTLOOK OF FLUORIDES AIR POLLUTION PREVENTION TECHNOLOGY--TACKLING WITH ALUMINUM SMELTING POLLUTION.

For primary bibliographic entry see Field 01.
APTIC-26136

DISTURBANCE OF ACID-BASE AND ENZYME EQUILIBRIUM IN EXPERIMENTAL INTOXICATION WITH SO2 AND PROTECTIVE ACTION OF AMMONIA.

(Enzymatische und Saeure-Basen-Gleichgewichtsstoerungen nach experimenteller SO2-Vergiftung sowie Schutzwirkung von Ammoniakdaempfen). Text in German. Int. Arch. Arbeitsmed., 26 (4): 316-334, 1970. 14 refs.
Stanislaw Kosmider, and K. Ludyga.
Identifiers: *Acid-base equilibrium, *Enzymes, *Ammonia, *Sulfur dioxide, Guinea pigs, Hematology, Mortality, Urinalysis, Proteins, Metabolism, Respiratory functions, Toxicity, Europe, Combustion gases, So2 removal (combustion products), Exposure methods, Ph.

In connection with a new method for neutralizing sulfur dioxide in combustion gases by means of ammonia, the changes induced by SO2 in guinea pigs were examined and compared with the effect of the products of the reaction of SO2 with ammonia. The first group of twenty guinea pigs were exposed to SO2 at a concentration of 2 g/cu Nm in a special toxicological chamber; the second group of twenty were similarly exposed to the products resulting from the reaction of SO2 with ammonia. The third group of twenty animals were exposed to SO2 at a concentration of 50 mg/ cu Nm for eight hours a day for four months, and the fourth group of twenty to the reaction products of SO2 plus NH3 for a period of four months. The blood of all the animals was examined for the level of hemoglobin number of erythrocytes and leukocytes, the colored indicator, and a percentage composition of leukocytes. Disturbances of acid-base equilibrium were investigated, as well as the pH of blood taken from left ventricle, the partial pressure of carbon dioxide and the total pressure of CO2 in the plasma. Also determined was the total protein level as the activity of aldolase, lactic acid dehydrogenase and asparagine and alanine aminotransferase. Urine contents of sugar, protein and morphotic components were determined for pH. Samples of liver and brain were taken after the animals had been sacrificed, and the activity of their enzymes was determined as well as those of the blood. The toxic activity of SO2 is multiple and leads to the impairment of the function of several organs. Toxic action of SO2 is due to the disturbances of the acid-base equilibrium brought about by the inhalation of acid products and by the disturbances of ventilation resulting from changes in the respiratory system. The decreased activity of aldolase and lactic-acid dehydrogenase in the blood and tissues in cases of SO2 intoxication may interfere with the carbohydrate metabolism, thus accounting for hyperglycemia and disturbances of glycogen synthesis in the tissues. Animals exposed to the reaction products of SO2 with ammonia had a statistically lower mortality rate. The chemical reaction of SO2 with ammonia reduces the disturbances of the acid-base equilibrium observed in SO2 intoxication and eliminates the enzymatic disturbances in the blood and tissues noted in SO2 intoxication. (Author abstract modified)
APTIC-26138

RECENT DEVELOPMENTS IN ENVIRONMENTAL CANCER.

A.M.A. Arch. Pathol., vol. 58:645-682, 1954. 272 refs.
W. C. Hueper.
Identifiers: *Cancer, *Carcinogens, Age, Epidemiology, Genetics, Occupational health, Smoking, Carcinogenes, Research methodologies, Fluorine compounds, Chlorinated hydrocarbons, Iodine compounds, Beryllium compounds, Selenium compounds.

Medical data and experimental observations are presented on dietary factors and cancer, miscellaneous potential carcinogens including those in tobacco smoke and tar, and specific aspects of environmental cancer. Discussed under the latter topic are population types and sizes of groups exposed to industrial carcinogens; age distribution of environmental and occupational cancers; mechanisms determining the distribution of environmental cancers; heredity and constitution; and control of cancer. A wider and more inspired use of the medical approach to environmental cancer is urged. Available clinical and pathologic data are adequate to distinguish, in many instances, occupational cancers caused by certain agents from those of unknown origin, without having to rely on supporting statistical evidence. Statistical and epidemiological methods snow in use are more suitable for finding attack rates and age, sex, and race selection than for establishing definite relations to specific causal agents.
APTIC-26144

HUMAN BEHAVIOR AND ATMOSPHERIC IONS.

Psychological Rev., 68 (3): 225-228, 1961. 17 refs.
Allan H. Frey.
Identifiers: *Behavior, *Ions, Rats, Humans, Ionization, Reaction mechanisms, Electric charge.

Behavioral effects of atmospheric ions are reviewed. Essentially, atmospheric ions are singly charged electrical condensers with radii of 5 times 10 to the minus 8th power cm. Air normally contains about 100 to 2000 ions per cc, with a preponderance of positive ions. However, various factors such as heat sources, operating electronic equipment, radioactive sources, storms, and aerosols can radically change the ion concentration and ratio. Pain in thermal burns has been observed to be apparently reduced by the effect of negative ions, while statistically confirmable connections have also been cited between atmospheric ionization and tinnitus. Ionization has been reported to affect the bleaching of visual purple and its restoration which are critical in vision. While Speicher found that positive ionization increased simple reaction time, whereas negative ionization decreased reaction time, Knoll on the other hand reported that the sign of the ion is not as important as the concentration. A negative ion environment appears to cause rats to increase their activity, as well as to decrease both error and time scores for learning a water maze. Krueger and Smith have suggested that positive air ion effects are mediated by the release of free serotonin while negative air ion effects depend upon the ability of negative ions to accelerate the enzymatic oxidation of serotonin. Thus, negative ions would have a reserpine type of effect whereas positive ions would have an iproniazid-25 sort of effect. Stress may also be a necessary condition for marked ion effects to appear.
APTIC-26149

PSYCHOLOGICAL AND BEHAVIORAL EFFECTS.

In: Project Clean Air. California Univ., Berkeley, Task Force No. 3, Section 3, 8p., Sept. 1, 1970. 25 refs.
Robert W. Reynolds.
Identifiers: *Maximum allowable concentration, *Behavioral effects, Primates, Nervous system, Respiratory system, Thresholds, Ussr, United states, Research methodologies.

A survey of the literature over the past ten years on the psychological and behavioral effects of air pollution has indicated a different pattern of effort in the Soviet Union and the United States. This difference in research effort is a direct result of an explicit difference in the criteria used by the two countries in establishing standards for the maximum acceptable concentrations of various air pollutants. Standards in the United States have been based primarily on levels of pollutants which induce pathological conditions, mainly in the pulmo-

sary system, while the Russians have emphasized levels of pollution that induce changes in behavior and electrophysiological responses in the central nervous system. However, since the Russian data emphasizes sensory thresholds, they yield standards that are probably unrealistically low. To approach the problem of realistic standards, it is suggested to begin intensive studies on the behavioral effects of air pollutants on a species much more similar, physiologically, to man--i.e., monkeys rather than rodents. In addition, the behavioral observations should involve tasks considerably more complex than simple sensory threshold determinations or performance on a simple reinforcement schedule.
APTIC-26156

PERMANENT DAMAGE TO THE NERVOUS SYSTEM CAUSED BY CARBON MONOXIDE POISONING OF A FETUS.

(Magzati CO mergezes indegrendszeri maradando artalma). Text in Hungarian. Orv. Hetil., 108 (33): 1559-1561, Aug. 13, 1967. 17 refs.
Lajos Szilagyi.
Identifiers: *Infants, *Nervous system, *Toxicity, *Carbon monoxide, Carboxyhemoglobin, Blood cells, Anemia, Anoxia, Europe, Engine exhausts, Fumes, Internal combustion engines.

Statistics show that carbon monoxide is the cause of a larger number of fatal poisonings than those caused by all the more lethal gases, taken collectively. The exhaust gases from an internal combustion motor have a CO content of 6-30%, depending on the fuel carburetion and the motor speed. In addition to the brain damage caused by anoxia, carbon monoxide has a direct action on the central nervous sytem, leading to such permanent damage as softening of the brain, hemiplegia, and Parkinson's disease. The author gives an eyewitness account of an unusual case of CO poisoning that affected an unborn fetus. The mother, transported 12 kilometers from her apartment to the hospital, was subjected to carbon monoxide fumes released inside the vehicle in which she was riding, so that the fetus was exposed to the fumes for 9 minutes. The resultant poisoning permanetly affected the child's nervous system; the case was followed for 12 years after the incident, during which time the child suffered from severe motor disturbances.
APTIC-26160

REPORT ON THE EPIDEMIOLOGICAL INVESTIGATION OF THE HEALTH EFFECTS OF AIR POLLUTION AND REPORT ON THE INVESTIGATION OF INFANT DEATHS IN THE YOKKAICHI DISTRICT.

(Yokkaichi chiku ni okeru taiki osen no kenko ni oyobosu eikyo ni kansuru ekigakuchosa oyobi nyuji shibo chosa kohoku). Text in Japanese. 37p., April 1966.
Personal Author Not Recorded.
Identifiers: *Yokkaichi, *Infants, *Epidemiology, *Mortality, *Respiratory diseases, Morbidity, Heart, Eyes, Respiratory system, Asthma, Laryngitis, Japan, Dusts, Sulfur dioxide.

An epidemiological study of air pollution in Yokkaichi is described. The subjects were 32,653 people who were enrolled in the national health insurance program. The affliction rate for each disease is represented by the number of medical treatments as a percentage of the total number of medical treatments per year. The illnesses include laryngitis, tonsilitis, bronchitis, bronchial pneumonia, bronchial asthma, cardial diseases, conjunctivitis, trachoma, and others. Isogrants for settling dust and sulfur dioxide concentrations were drawn based on deposit gauge and lead peroxide candle measurements. These data were tabulated according to age groups. Correlations were calculated for afflication rates and settling dust and sulfur dioxide. Significant correlations were found for laryngitis, cold, bronchial asthma and sulfur dioxide and bronchial asthma and settling dusts. For the age group over 50, cold and bronchial asthma are highly correlated to air pollution. For 0 to 4--year olds, there was no correlation between the illnesses and air pollution. Morbidity for laryngitis, cold, and bronchial asthma in polluted areas was 2-3 times that of non-polluted areas, and over six times for those over 50. Laryngitis and cold were very frequent among the infants, and bronchial asthma was very frequent among the infants and the aged. The death rate for babies was also investigated for Yokkaichi.
APTIC-26169

EXPERT COMMITTEE REPORT ON THE STANDARDS FOR ENVIRONMENTAL POLLUTION DUE TO CARBON MONOXIDE.

(Issanka tanso ni yoru kankyo osen no kankyo kijun ni kansuru senmon iinkaihoboku). Text in Japanese. 6p., Sept. 1969.
Personal Author Not Recorded.
Identifiers: *Maximum allowable concentration, *Health impairment, *Carbon monoxide, Humans, Carboxyhemoglobin, Circulatory system, Heart, Nervous system, Alveoli, Pulmonary function, Retention, Toxic tolerances, Anemia, Japan.

The Expert Committee on the Environmental Standard for Carbon Monoxide Pollution investigated the relationship between carbon monoxide (CO) concentrations, exposure period, and effect of CO in the human body. The recommended method of CO pollution measurement involves the use of a non-dispersive infrared analyzer (NDIR), a continuous monitoring device yielding data in hourly average CO concentrations, and measurement at locations where the results have significance in terms of the effect of CO on humans. The effects are, hindrance of oxygen transportation due to CO-Hb production, functional disorder caused by chemical combination of CO with substances in the body other than Hb, and hindrance of CO-Hb dissociation in the alveoli. Some of the effects of CO at various concentrations are as follows. In order for the CO-Hb/Hb ratio increased due to breathing an hourly average concentration of 20 ppm CO to be reduced to normal, a person has to stay at a location with 5ppm/hour or less for more than eight hours. Time-discriminating ability starts to decline when CO-Hb/Hb reaches 2%. For patients with coronary thrombosis the continuation over a few days of 24-hour aveage CO concentration of 10 ppm/hour leads to ingravescence of the illness. Nervous system functions decline and anemic persons as well as those with bodily organ circulation disorders die sooner at CO-Hb/Hb over 5%.
APTIC-26170

A FOLLOW-UP STUDY OF LEAD WORKERS.

Brit. J. Ind. Med. (London), vol. 20:313-315, Oct. 1963. 6 refs.
I. Dingwall-Fordyce, and R. E. Lane.
Identifiers: *Lead compounds, *Nervous system, *Cancer, Adults, Males, Mortality, Occupational health, Great britain, Industrial emission sources, Storage batteries, Statistical analyses.

To investigate the suggestion that lead derivatives might cause cancer in man, the causes of death among workers known to have been exposed to lead were studied. A group of companies made available the records of their pension fund, and a storage battery factory provided details of men who had died while in their employ. Details of each man's exposure to lead were supplied. There were 425 pensioners, of whom 184 had died; 153 deaths occurred among an unknown number of employed men who had not yet reached pensionable age. Expected deaths were calculated from the appropriate rates for all males in England and Wales. It was concluded that there was no evidence to suggest that malignant disease was related to lead absorption. There was, however, evidence that heavy exposure to lead was associated with an increased incidence of deaths from cerebrovascular catastrophies. (Author abstract modified)
APTIC-26177

TOXICITY OF OZONE. II. EFFECT OF OXYGEN AND CARBON DIOXIDE UPON ACUTE TOXICITY.

Ind. Med. Surg., 26 (2):63-66, Feb. 1957. 11 refs.
Sidney Mittler, Delores Hedrick, and Leonard Phillips.
Identifiers: *Ozone, *Toxicity, Guinea pigs, Mice, Rats, Exposure methods, Carbon dioxide, Oxygen, Reaction mechanisms.

To determine whether 100% oxygen had an influence upon the toxicity of ozone, animals were exposed for three hours to ozone made from and diluted with 100% oxygen. Rats, guinea pigs, and mice were also exposed to ozone made from filtered, dry air enriched with carbon dioxide to form a 2% carbon dioxide-air-ozone mixture. Ozone in 100% oxygen has no influence on the toxicity of ozone for rats and guinea pigs. Ozone in a 2% carbon dioxide-air mixture was more toxic for guinea pigs than ozone in air, but the 2% carbon dioxide had no significant effect on the toxicity of ozone for mice and rats. Several explanations are included. (Author summary modified)
APTIC-26188

CARCINOGENIC HAZARDS OF AROMATIC POLYCYCLIC HYDROCARBONS IN THE POLLUTED ATMOSPHERE.

Occupational Health Rev. (Ottawa), vol. 14: 3-10, 1962. 19 refs. (Presented at the Canadian Public Health Association, Annual Meeting, Regina, Saskatchewan, June 6, 1961.)
Morris Katz.
Identifiers: *Carcinogens, *Polynuclear compounds, Humans, Epidemiology, Mortality, Deposition, Retention, Lung cancer, Canada, Urban areas, Smokes, Fluoranthenes, Perylenes, Benzopyrenes, Sulfur dioxide, Fluorescence, Reaction mechanisms.

The problem of association between certain forms of cancer and air pollution is reviewed, as various investigators have noted that the central business district and industrial sections of large metropolitan areas, where the most severe degree of air pollution is found normally, show the highest lung cancer death rates. Probably the first fundamental study to show the direct relation between cancer incidence and polycyclic aromatic hydrocarbons was that initiated by Stokes in 1952 in the North Wales and Liverpool Hospital Region. The results included information on standardized mortality ratios for cancer of the lung and bronchus, and of the intestine and rectum in relation to the atmospheric content of smoke, sulfur dioxide, and the polycyclic hydrocarbons pyrene, fluoranthene, 3,4-benzpyrene, and 1,12-benzperylene. Sawicki found a remarkable difference in the benzpyrene content of the particulate phase of air pollutants between eastern and western American cities; the content of this carcinogenic hydrocarbon was very much lower in the western cities. Prolonged particle retention in the trachea and bronchus may result from irritants capable of inhibiting ciliary action and retarding the flow of mucus. Destruction of the superficial cells by irritants may lead to the deposition of carcinogenic particulates on the basal or regeneration layers of cells and thus provide a stimulus for the gradual development of cancerous tissue. The technique of fluorescence spectroscopy is proving useful in relating structural properties of the polynuclear aromatic hydrocarbons to the presence or absence of carcinogenic activity. Factors in the carcinogenic activity of the polycyclics are considered, as well as future trends in research.
APTIC-26206

ENVIRONMENTAL INFLUENCE ON INTRAUTERINE LUNG DEVELOPMENT.

Preprint, National Air Pollution Control Administration, Durham, N. C., Medical Research Branch and North Carolina Univ., Chapel Hill, Div. of Newborn Sciences, 14p., 1970. 26 refs.
John H. Knelson.
Identifiers: *Fetus, *Cell growth, *Lungs, Sheep, Hormones, Respiratory functions.

A model with well-defined characteristics for evaluating environmental influence on organ maturation seems desirable, and at least a preliminary definition of such a model is now available, using the developing lung. An initial series of experiments was designed to test the hypothesis that mechanical stability could be enhanced in less mature lamb lungs by administration of glucocorticoid to the fetus. Corriedale ewes with multiple pregnancies of approximately 100-130 days gestation were selected for study. One twin was left undisturbed to serve as a control, while hydrocortisone sodium succinate was injected through a catheter into the other lamb every 6 hours for a total daily dose of 20 mg intravenously or 50 mg intraperitoneally. Lambs were obtained either by spontaneous delivery or caesarian section after 1 1/2 to 5 days infusion, and the mechanical properties of their lungs were evaluated by determining their pressure-volume characteristics when inflated with air. After equilibration at 40 cm water transthoracic pressure, the lungs, intact in the thorax, were allowed to passively deflate at fixed decrements in pressure and the resultant volume changes measured. From control animals, all of the lower lobe samples and all but one of the upper lobe samples had abnormally high minimum surface tensions; the samples from steroid-treated fetuses had normal surface tensions with the exception of one lower lobe sample from a 122-day lamb and an upper lobe sample from a 100-day lamb. During the subsequent lambing season, a second more elaborate set of experiments was conducted in which one fetus received 10 mg of cortisone per day while the other received saline. The lungs of treated lambs inflated much more easily than those of the untreated twins but returned to near airlessness on deflation, indicating a lack of alveolar stability. Whereas the amount of air at 40 to 30 cm H2O pressure during deflation was significantly greater in the treated group, there was no significant difference at lower pressures. Experimental differences between the two studies are described, as well as data concerning possible mechanisms through which the observed changes are affected.
APTIC-26207

HEALTH EFFECTS RESEARCH PROGRAM OF THE NATIONAL AIR POLLUTION CONTROL ADMINISTRATION.

For primary bibliographic entry see Field 12.
APTIC-26213

PROJECT REPORT: LEAD.

In: Project Clean Air. California Univ., Berkeley, Lawrence Radiation Lab., California Univ. Task for Assessments, vol. 2, App.-G, 11p., June 29, 1970. 43 refs.
Stephen A. Landaw.
Identifiers: *Blood chemistry, *Metabolism, *Lead compounds, Humans, Urinalysis, Blood cells, Enzymes, Metal poisoning, Spectrometry.

Recent findings in the literature concerning the metabolism and biologic effects of lead are briefly reviewed, together with advances in detection of lead in biologic tissues. Atomic absorption and X-ray emission spectroscopy now seem the most favorable methods, although an ion selective electrode under development would greatly simplify lead analyses. A close correlation has been found experimentally between blood lead levels and estimated exposure to lead in inspired air. It appears that normalcy for lead exposure is relative, and that inhibition of the red blood cell enzyme ALA dehydrase can be shown for the ranges of blood lead previously considered 'safe.' Urine and hair content of lead are sensitive indicators of lead exposure. Retention of environmental lead within the body depends not only on route of entry but also on the physical nature of the lead, e.g., inhalation as a vapor or aerosol, or by intravenous injection. The major known biochemical alterations in lead poisoning are concerned with deranged heme metabolism; at present, at least three steps in porphyrin synthesis appear to be affected. The classical hematologic changes associated with lead poisoning are microcytic hypochromic anemia and basophilic stippling and increased mechanical fragility of red blood cells, although none are specific for lead poisoning; bone marrow depression may also result. Subjects for future research are suggested.
APTIC-26215

TOXICITY OF OZONE. IV. SILICONE AEROSOLS AND ALCOHOL VAPOR THERAPY IN OZONE POISONING.

Ind. Med. Surg., 27 (1):43-45, Jan. 1958. 11 refs.
Sidney Mittler.
Identifiers: *Inhalation therapy, *Toxicity, *Ozone, Mice, Hematology, Mortality, Enzymes, Proteins, Alveoli, Respiratory functions, Asphyxiation, Pulmonary edema, Aerosols, Alcohols, Oxygen, Silicon compounds, Vapors.

Since mice exposed to ozone appeared to die of asphyxiation, the use of various antifoam agents was tried as therapy. If death from pulmonary edema is due to interference with gas exchange in the alveoli, the presence of foam in the respiratory passageways may prevent the tidal air from reaching and mixing with air in the alveoli. Oxygen, oxygen-helium mixtures, and oxygen-alcohol vapor mixtures did not help ozone-injured mice to survive. Silicone aerosols also had no significant effect on ozone-injured mice. It was thought that if the edematous foam is lined with proteinaceous material, then protein-splitting enzymes such as trypsin did not protect ozone-injured animals from death either. Death may be a result of hemorrhage of lung capillaries rather than as a result of edema.
APTIC-26217

SATURATED HYDROCARBONS IN SKIN SURFACE LIPIDS.

Brit. J. Dermatol., vol. 77:303-308, June 1965. 24 refs.
C. A. Lewis, Barbara J. Hayward, and R. M. B. MacKenna.
Identifiers: *Lipids, *Skin, *Hydrocarbons, Humans, Great britain, Petroleum production, Chromatography.

Evidence is presented on the occurrence and origin of saturated hydrocarbons in the skin surface lipids of the human back. After swabbing with acetone, the skin surface lipids were chromatographed on columns of Florisil and on thin-layer plates of silica gel G. Yields of lipid collection contained 1-2% of saturated hydrocarbons, although this figure fell to 0.2% in lipid collected under conditions contrived to eliminate contamination from clothing and the environment. These hydrocarbons are contaminants, derived presumably from petroleum products, and the possibility must be considered of their petroleum products, and the possibility must be considered of their interference with the normal biochemical and morphological processes of the skin. A possible contribution of these environmental hydrocarbons to the pathogenesis of comedones in acne vulgaris is discussed.
APTIC-26221

HEALTH EFFECTS OF PHOTOCHEMICAL OXIDANTS.

In: Project Clean Air. Yale Univ., New Haven, Conn., School of Medicine, California Univ., Task Force Assessments, Vol. 2, App.-H, 17p., 1970. 35 refs.
Margaret Hitchcock.
Identifiers: *Health impairment, *Oxidants, Chronic, Laboratory animals, Life span, Lungs, Metabolism, Pulmonary function, Synergism, Eye irritation, Respiratory diseases, Los angeles, Smog, Ozone, Peroxyacetyl nitrate.

The pulmonary and sensory effects of ozone, oxidants, and peroxyacyl nitrates are reviewed on the basis of human and animal studies. These photochemical oxidants also act indirectly by modifying the organism's response to other agents. In areas where oxidant-type air pollution is worst, such as Los Angeles, over 90% of the measured oxidant is present as ozone. Both short- and long-term experimental exposures of humans produce reversible changes in pulmonary function, although there is extreme variability in individual sensitivity. So far only animal experiments suggest that long-term ozone exposure can cause chronic respiratory disease, may accelerate the natural ageing process, and may increase susceptibility to infection. Many of the known adverse effects of photochemical pollution are not caused by ozone, but rather by oxidants which produce changes in lung structure and function in experimental animals. There is some evidence the exposure to PAN results in increased oxygen uptake during exercise in humans; PAN is also one of the chemicals involved in the eye irritation caused by smog. Topics for future research are suggested.
APTIC-26223

BIOGEOCHEMICAL IMPLICATIONS OF LEAD IN THE HYDROSPHERE.

For primary bibliographic entry see Field 08.
APTIC-26224

EFFECTS OF PHOTOCHEMICAL POLLUTANTS ON THE RESPIRATORY TRACT.

In: Project Clean Air. California Univ., Berkeley, Vol. 2, App.-A, 26p., Sept. 1, 1970. 65 refs.
Frank E. Speizer.
Identifiers: *Respiratory diseases, *Photochemical reactions, Research programs, Acute, Laboratory animals, Children, Epidemiology, Morbidity, Mortality, Cells, Respiratory system, Pulmonary resistance, Los angeles, Oxidants.

Some of the existing data on the effects of photochemical pollution on the respiratory tract of animals and man are summarized, while areas in which important knowledge is lacking and the direction which certain aspects of research might take are indicated. The photochemical pollutants which are generally measured include nitrogen dioxide, oxidants which are principally ozone but include other oxidizing agents, and hydrocarbons mainly in the form of methane. Recent studies in experimental animals with both 03 and NO2 have demonstrated cellular injury and an increased susceptibility to bacterial pulmonary infections. Human experimental exposures to 03 above 1.0 ppm consistently produce modest increases in airway resistance measured directly or indirectly by changes in forced expiratory volumes. The retrospective epidemiologic data on mortality and morbidity in association with acute exposure to varying levels of ambient pollution primarily in the Los Angeles area are presented tabularly. No correlations between acute weather patterns and mortality or change in morbidity in patients with significant respiratory disease have been found. However, others have been able to establish that children who live in areas with high levels of pollution have higher respiratory disease morbidity than children from less polluted areas. Research programs which may affect air pollution control policies are indicated.
APTIC-26227

A DEVICE FOR THE PROLONGED AND REPEATED EXPOSURE OF ANIMALS TO CARBON MONOXIDE. (CHRONIC CARBON MONOXIDE POISONING SERIES II).

Med. J. Shinshu Univ., 3 (3):179-184, Sept. 1968.
Shiro Kamei.
Identifiers: *Exposure chambers, *Carbon monoxide, *Pathological techniques, Animals, Japan, Operating variables, Design criteria, Humidity, Temperature.

A large gas chamber was designed to permit the repeated exposure of a large group of animals to carbon monoxide for periods as long as 120-150 days. Procedures used to conduct gas into the chamber and to ventilate the chamber are described in

detail, and the chamber and its auxiliary equipment are schematically illustrated. The auxiliary equipment includes a carbon monoxide generator, gas tank, water controller, and exhaust fan. By means of compound funnels, definite concentrations of carbon monoxide-air mixtures are introduced homogeneously into the chamber. Performance data is presented on temperature and humidity in the chamber and on the diffusion and homogeneity of the gas in the chamber.
APTIC-26236

POSSIBLE ASSOCIATION OF MOTOR VEHICLE ACCIDENTS WITH POLLUTANT LEVELS IN LOS ANGELES.

In: Project Clean Air, Vol. 2, California State
Dept. of Public Health, California Univ. Research
Proj. S-23, 32p., Sept. 1, 1970. 22 refs.
Hans K. Ury, John R. Goldsmith, and Norman M. Perkins.
Identifiers: *Motor vehicle accidents, *Oxidants, *Carbon monoxide, Los angeles, Streets, Vehicles, Statistical analyses.

A simple, robust and reasonably efficient nonparametric statistical method used to compare Los Angeles motor vehicle accident (MVA) frequencies with the levels of two air pollutants, oxidant (OX) and carbon monoxide during two high-OX and two high CO periods. Statistically quite significant association is found for OX and MVA, but no association appears to exist between CO and MVA. Thus, more often than not, increasing OX levels are accompanied by an increase in the frequency of MVA, while MVA frequencies remain essentially unchanged when CO levels increase. Lag studies of one to three hours show decreasing OX-MVA association and continuing non-association for CO and MVA. The potential pitfalls in this study are discussed in detail. Day-of-week, hour-of-day, and seasonality effects have been eliminated by the statistical design. The possible effects of temperature and traffic density variability within the same hour of day cannot be discounted completely, but it is shown that neither is likely to be important. Errors in the listing of MVA data tend to make it more difficult to spot an actual underlying association; the overall effect of this, however, should again be minor. However, spurious correlation cannot be ruled out entirely. The effects of several other pollutants will have to be studied during the high-OX periods. (Author abstract modified)
APTIC-26247

THE EFFECT OF OZONE IN THE ANTI-BACTERIAL DEFENSE MECHANISMS OF THE MURINE LUNG.

California Univ., Davis, Dept. of Internal
Medicine, California Univ., Research Proj. S-5,
9p., Sept. 1, 1970. 13 refs.
Elliot Goldstein.
Identifiers: *Immunology, *Lungs, *Bacteria, *Ozone, Mice, Pulmonary function, Ventilation (pulmonary), Infectious diseases.

The effect of ozone on anti-bacterial activity in vivo was investigated by simultaneously determining the physical removal and intrinsic bactericidal activity rates of the murine lung. Mice were exposed to various concentrations of ozone for 17 hours prior to or 4 hours after infection with aerosols of radiolabelled Staphylococcus aureus; the rates of bacterial removal and inactivation were quantitated. Animals infected and then exposed to ozone showed a progressive decrease in pulmonary bactericidal activity. (Control mice 85.0 plus or minus 1.5; ozone 0.66 ppm 75.7 plus or minus 3.8; 0.95 ppm 50.3 plus or minus 11.9; 2.39 ppm 99.4 plus or minus 33.5; 4.25 ppm 102.7 plus or minus 26.8. P 0.05 of each control and ozone comparison). Physical removal of bacteria did not account for these differences. Exposure to ozone prior to infection caused severe ventilatory abnormalities and lesser decreases in bactericidal activity. These experiments demonstrate that murine resistance to pulmonary infection is affected adversely by exposure to ozone, and that this model can be used for assessing the biological significance of different atmospheric concentration of ozone. (Author abstract modified)
APTIC-26249

STOMACH CANCER AND AIR POLLUTION: AN EXPERIMENTAL STUDY IN A PETROCHEMICAL AREA.

Texas Rep. Biol. Med., 27 (3):787-793, Fall 1969.
14 refs.
Jack Neal, and R. H. Rigdon.
Identifiers: *Leukemia, *Pulmonary edema, *Benzopyrene, Mice, Stomach, Tumors, Particulates, Chemical processing, Petroleum production.

Since benzo (a)pyrene is one of the hydrocarbons frequently present in polluted air, mice have been fed air pollutant particles and observed for gastric tumors. The total particulate matter was obtained from air in the vicinity of petrochemical plants, the chief products of which are styrene monomer, vinyl chloride, acrylonitrile monomer, polyethylene polymer, methanal, tertiary-butylamine, detergent bases, resins of all types, high octane gasoline, and carbon blacks. Inorganic chemicals, such as tin, sulfuric acid, arsenic, diacalcium phosphate and fertilizers, are also produced in this area. When the CFW strain of mice is fed a ration containing 0.25 mg of benzo (a)pyrene per gram of food, the number of gastric tumors, pulmonary adenomas, and leukemia is marekdly increased. While there is a statistical relation between the frequency of leukemia and the number of pulmonary adenomas, there is no relationship between the occurrence of gastric neoplasms and either leukemia or pulmonary adenomas in the mice fed benzo (a)pyrene.
APTIC-26250

FABRICATION OF MONODISPERSE LUCITE AND IRON OXIDE PARTICLES WITH A SPINNING DISK GENERATOR.

Health Phys., vol. 10:933-940, 1964. 7 refs.
Roy E. Albert, Henry G. Petrow, Abdel S. Salam, and Jack R. Speigelman.
Identifiers: *Aerosol generators, Animals, Humans, Lungs, Deposition, Lung clearance, Particle size, Iron oxides, Isotopes, Radioactive tracers.

A technique is described for producing radioactive lucite and iron oxide spheres from one to eight microns in size and having a minimum size uniformity of 10% standard deviation. The method involves the atomization, with a spinning disk generator, of iron oxite sol or lucite in a xyleneacetylacetone solution. Tagging of the particles is done by adding the isotope either in carrier-free form to the sol or dissolving the acetylacetone-chelate of the isotope in the solvent for lucite. The particles are intended for use in studies of the deposition and clearance of particles from both human and animal lungs. The leachability of a variety of isotopic tags from the particles is described. (Author abstract modified)
APTIC-26251

A SENSITIVE PROCEDURE FOR DETERMINING CARBON MONOXIDE IN BLOOD OR TISSUE UTILIZING GAS-SOLID CHROMATOGRAPHY.

Toxicol. Appl. Pharmacol., vol. 1:135-143, 1959. 9 refs.
A. M. Dominguez, H. E. Christensen, L. R.
Goldbaum, and V. A. Stembridge.
Identifiers: *Carboxyhemoglobin, *Gas chromatography, *Carbon monoxide, Blood cells, Tissues.

A gas chromatographic procedure is described that permits the accurate determination of small but physiological significant amounts of carboxyhemoglobin on the basis of comparison of peak height reading of carbon monoxide content and carbon monoxide capacity. A ferricyanide reagent is used in liberating carbon monoxide from hemoglobin in diluted blood or tissue extract, with the procedure for carbon monoxide capacity involving saturating a portion of the sample with carbon monoxide gas. The method is rapid and simple. Blood extracted from tissue and containing as little as 0.5 mg hemoglobin per ml and 10% carboxyhemoglobin have been analyzed satisfactorily. Samples containing less than 10% carboxyhemoglobin show an analytical error of less than 10% of the determined values, and samples containing greater than 10% an error of less than 5%. The presence of other gases does not interfere with determinations. Blood and tissue carbon monoxide results obtained by this procedure are supported by examinations of over 600 aircraft accident cases.
APTIC-26252

LEAD IN THE ENVIRONMENT AND ITS EFFECT ON MAN IN JAPAN.

Osaka City Med. J. (Japan), 16 (1):1-28, 1970. 31
refs. (Presented at the International Conference on
Chemical Pollution and Human Ecology, Prague,
Czechoslovakia, Oct. 1970.)
Kazuya Horiuchi.
Identifiers: *Lead compounds, *Retention, Laboratory animals, Humans, Hematology, Urinalysis, Excretions, Ingestion, Breathing, Japan, Engine exhausts, Particulates, Air quality measurements, Absorption.

The normal Japanese adult ingests about 230-320 micrograms of lead/ day with food and liquids and inhales about 80 micrograms. Approximately 90-95% of the lead ingested through the alimentary tract may be unabsorbed and discharged to the feces: the fecal lead amount is usually equivalent to the amount of lead ingested. Lead taken in through the respiratory tract remains in the body much longer than that taken in through the alimentary tract. The total body lead content of an adult Japanese may be over 100 milligrams, including the lead in whole blood. Lead in whole blood and urine appears to be related to motor exhaust, but additional studies are needed to clarify the relationship. Measurements made by the National Air Sampling Network indicate that the average lead content of particulate matter is 0.51 mcg/cu m, which is below values obtained in the United States.
APTIC-26260

THE TOXICOLOGICAL BASIS OF THRESHOLD LIMIT VALUES: 5. THE EXPERIMENTAL INHALATION OF VAPOR MIXTURES BY RATS, WITH NOTES UPON THE RELATIONSHIP BETWEEN SINGLE DOSE INHALATION AND SINGLE DOSE ORAL DATA.

Am. Ind. Hyg. Assoc. J., 20 (5):364-369, Oct. 1959.
3 refs. (Presented at the American Industrial
Hygiene Association, Annual Meeting, 20th,
Chicago, Ill., April 25-May 1, 1959.)
U. C. Pozzani, C. S. Weil, and C. P. Carpenter.
Identifiers: *Ingestion, *Breathing, *Hydrocarbons, *Vapors, *Thresholds, Rats, Toxicity, Toluenes, Nitriles, Carbon tetrachloride, Acetone.

Experiments designed to determine the relationship between the inhalation threshold values of composite hydrocarbon vapors and the values of the individual components of these vapors are described. The relationship between the inhalation and the oral values is also considered. The components of the 15 commercial chemical mixtures and the 36 chemical pairs tested did not in any case act in a markedly less or markedly more than additive manner by the respiratory route. This observation was also true for the 15 commercial chemical mixtures and 23 chemical pairs tested orally. The acetone-acetonitrile and the carbon tetrachloridehexane pairs showed a slight tendency to act in a more than additive manner by inhalation, as was also true for the acetone-acetonitrile pair by oral administration. The ethyl acetate-toluene pair tended to act in a slightly less than additive manner orally. All of the values of the above pairs fell out-

side of the 95% dispersion zone described by the value, 1.96 times the standard error of estimate of Y, but it must be recalled that even if all of a large number of chemical mixtures acted in a strictly additive manner, one would still expect 5% of the values to lie outside of the 'dispersion' zone. The various comparisons discussed previously are summarized in tabulated form. The highest correlations were found between the predicted inhalation and observed inhalation values. However, the lower but still significant correlations between the observed oral and observed inhalation values suggest that one can estimate a single dose inhalation value from oral data with a fair amount of reliability. Although the formula used to predict the threshold values of chemical mixtures is theoretically suitable only for similar joint action, it provided a fairly accurate method for predicting the single dose toxicity of mixtures from the single dose toxicity data of their components. (Author summary modified)
APTIC-26270

TOXICOLOGICAL ASPECTS OF ATMOSPHERIC NITROGEN OXIDES.

In: Project Clean Air. California Univ., Berkeley, Air and Industrial Hygiene Lab., Vol. 2, p. K1-K15, 1970. 13 refs.
Peter K. Mueller.
Identifiers: *Toxicity, *Nitric oxide (no), *Nitrogen dioxide (no2), Mice, Rats, Epidemiology, Lungs, Pulmonary function, Health impairment, Respiratory diseases, Engine exhausts, Carbon monoxide, Oxygen, Ozone.

The results of toxicological and biochemical appraisals of the effects of atmospheric nitrogen dioxide and nitric oxide are presented. The effects are primarily on the lungs and the senses. There may be impairment of pulmonary function in humans at concentrations found in polluted air. NO2 and also ozone and even oxygen tend to oxidize in animals the lung tissue for a time. Long-term exposure to low levels of NO2 can produce pre-emphasematous lesions in the lungs of rats and mice. NO2, O3 and dilute irradiated car exhausts increase suceptibility to respiratory infection. The epidemiological significance remains to be determined. A large number of inherent variables make the epidemiological aspects of this question highly esoteric. The role of nitric oxide alone or in combustion with NO2 remains virtually unexplored. Despite that its lethal dose is considerably higher than that for NO2, low concentrations reactions of NO with tissue components in Vivo are potentially capable of creating acute and chronic impairment of function. While attention has heretofore centered on studies with single substances, experimental protocols should henceforth take into consideration that the environmental experience of man includes simultaneous and sequential intermittent fumigations to NO, NO2, nitric acid, ozone and carbon monoxide to mention a few of the main gases together with particles bearing ammonium nitrate, ammonium sulfate, possibly sulfuric acid, aldehydes and a host of carbonaceous compounds and trace elements such as lead, cadmium and mercury. Attempts to analyze the interaction of such a complex environmental milieus with the complexicity of the host tissue are (perhaps understandably) completely lacking. (Author summary modified)
APTIC-26271

TASKS AND PROBLEMS OF INDUSTRIAL TOXICOLOGY FROM THE VIEWPOINT OF TECHNICAL CHEMISTRY.

(Aufgaben und Probleme der Industrietoxikologie aus der Sicht der technischen Chemie). Text in German. Chem. Tech. (Berlin), 17 (1):38-41, Jan. 1, 1965.
Karlheinz Lohs.
Identifiers: *Toxicity, Humans, Occupational health, Tar, Germany, Industrial areas, Dusts, Fly ash, Smog, Smokes, Pesticides, Chemical methods, Measurement methods, Humidity, Hydrocyanic acid, Aldehydes, Ammonia, Fluorides, Olefins, Ketones, Tetraethyl lead, Peroxyacetyl nitrate, Carbon monoxide, Nitrogen oxides, Sulfur dioxide, Sulfur trioxide.

Industrial toxicology faces two complexes of problems. The first are problems arising from the manufacture and processing of toxic raw, intermediary, and primary materials; the second complex encompasses problems which the manufacturing process poses for the biosphere. Hydrocyanic acid, tetraethyl lead, and some very toxic insecticides (organic derivatives of phosphoric acid) are examples of the first category. While industrial analytical instruments working on the principle of chemical reactions or their physical manifestations have an accuracy of around 0.1 ppm, some toxicologically dangerous chemicals require a detection accuracy of the order of 0.001 ppm which requires biochemical and biophysical detection methods. Another problem are the periodic clinical checkups of employees because in some cases toxic manifestations have appeared in the form of secondary manifestations without acute symptoms. Lack of knowledge and information complicates the setting up and enforcement of hygienic norms. Toxic emissions posing problems are industrial dusts, ash and smoke, oxides of sulfur and of nitrogen, hydrocarbons, aldehydes, acids, ammonia, tars, ketones, peroxides, nitroolefines, and carbon monoxide. Catastrophies caused by smog are known from Europe as well as from North America when aerosol concentrations reached levels exceeding 2 mg/cu m as against the 100 microg/cu m level of normal industrial pollution. The London smog is as a result of high humidity characterized by a high content of sulfur trioxide in addition to sulfur dioxide, a highly irritating combination. The most toxic component of photochemical smog resulting from the action of ultraviolet irradiation on smog is peroxyacetyl nitrate which is highly toxic to humans and plants at very low concentrations. Other problems are exemplified by fluoride dusts and emanations from the manufacture of polyethylene.
APTIC-26274

A STATISTICAL STUDY ON CHRONIC RESPIRATORY DISEASE AMONG STUDENTS OF JUNIOR HIGH SCHOOL IN ODAWARA CITY.

(Odawara shinai chugakko seito no mansei kokyuki shikkan no jittai ni tsuite). Text in Japanese. Shoni Hoken Kenkyu (J. Child Health), 28 (5):183-188, Aug. 1970. 13 refs.
Bunta Ishida.
Identifiers: *Odawara, *Asthma, Questionnaires, Chronic, Children, Epidemiology, Morbidity, Japan, Urban areas, Engine exhausts, Automobiles.

The actual condition of chronic respiratory disease was investigated for 7703 junior high school pupils in Odawara city, Kanagawa Prefecture which was classified as a contaminated area in Oct. 1968. The method of investigation involved the distribution of questionnaires to every home represented in each school; parents completed and then returned them. Asthma complaints amounted to 3.8% of the first-year, 3.7% of the second-year, and 3.2% of the third-year pupils in junior high school. The general incidence of asthma complaints among junior high school pupils in Odawara city was 3.2 - 3.8%. Dividing pupils into those from the old city and a new suburb, asthma complaints were 4.1% of first-year pupils in the old city and 2.9% in a new suburb; 4.6% of second-year pupils in the old city and 3.1% in a new suburb; 4.0% of third-year pupils in the old city and 2.1% in a new suburb; there was a significant difference in asthma complaints between the old city and a new suburb, the former having the higher incidence. More cars ran in the old city than in thynew suburb and the difference in the percentage incidence of asthma complaints seemed to have some relationship to the exhaust gases from cars.
APTIC-26283

THE HEALTH COSTS OF AIR POLLUTION.

Congressional Record, 116 (150): S14394-S14402, Aug. 27, 1970. 134 refs.
Personal Author Not Recorded.
Identifiers: *Costs, *Health impairment, Economic losses, Adults, Infants, Epidemiology, Morbidity, Mortality, Lung cancer, Cardiovascular diseases, Bronchitis, Mathematical modeling.

The results of research relating the effects of air pollution to human health are presented. An attempt is made to establish a quantitative relationship between morbidity, mortality, and air pollution. A simple linear mathematical model is utilized in the investigation. Epidemiological studies and episodic events are useful sources of data. A literature review of studies of bronchitis, lung cancer, cardiovascular disease, total respiratory diseases, and infant mortality is presented. The validity of these studies, in terms of both basic methodology and statistical bias, is discussed. Direct and indirect economic costs of disease are considered, and the health cost of air pollution is derived.
APTIC-26285

PRESENT STATE OF AIR POLLUTION IN YOKKAICHI AND VARIOUS MEDICAL PROBLEMS ABOUT IT.

(Yokkaichi-shi ni okeru taiki osen no genkyo to igakuteki shomondai). Text in Japanese. Sangyo Igaku Kenkyusho Gyosekishu (Report Inst. Ind. Med.), no. 3:48-55, June 1969. 16 refs.
Masayuki Imai, Hidehiko Oshima, Yoshikazu Takatsuka, Masayoshi Kitabatake, and Katsumi Yoshida.
Identifiers: *Yokkaichi, *Respiratory diseases, Chronic, Adults, Children, Infants, Epidemiology, Health statistics, Morbidity, Asthma, Bronchitis, Common cold, Japan, Urban areas, Dust fall, Sulfuric acid, Nitrogen dioxide (no2), Sulfur dioxide.

Conditions of air pollution, epidemiological investigations, the findings of medical examinations of the inhabitants and school children and the state of the patients connected with air pollution in Yokkaichi city were reported. Falling dust has decreased with every year or remains on the same level; however, a proportion of soluble components is much more than that of other cities, and soluble components have been acidified constantly with every year since 1961. Sulfur dioxide increased rapidly from the end of 1961 to early 1962, and remained on the same level afterwards; however, the trend of increase has been observed since 1965. Nitrogen dioxide is below about one tenth compared with SO2. Sulfuric acid is detected from the air almost constantly. The incidence rates of various diseases were observed by means of receipts of the National Health Insurance for 4 years from 1961. The diseases which were recognized to be very related to air pollution were common cold, bronchitis, front ophthalmopathy, bronchial asthma, and pharyngitis. There was high correlation between the diseases and SO2 rather than falling dust. Furthermore, a high correlation was observed among infants and children in pharyngitis, and among aged people in bronchial asthma. The investigation by means of questionnaires was carried out on the inhabitants of over 40 years of age in contaminated areas chosen with different pollution levels. The number of people suffering from chronic bronchitis and asthma-like attacks increased with the height of the degree of pollution with SO2 in the area. Medical examinations in junior high schools in contaminated areas also showed the tendency to obstructive disturbances. Half of the recognized patients by the Environmental Pollution Relief Law were seen in Shiohama district, a high contaminated area. The people who had moved to outside the city or non-contaminated area showed clinical improvement or healing at a high rate after moving out.
APTIC-26305

ACTUAL REPORT OF INFLUENCE OF AIR POLLUTION ON THE BODIES.

(Kogai (taiki osen) ga shintai ni oyobosu eikyo no jittai chosa hokokusho). Text in Japanese. 40p., March 1969.
Personal Author Not Recorded.
Identifiers: *Respiratory system, *Health impairment, *Sulfur dioxide, Annual, Diurnal, Monthly, Children, Males, Females, Eyes, Epidemiology, Nostrils, Sinuses, Trachea, Japan, Dust fall, Soot fall.

For investigating the influence of air pollution on the bodily functions of elementary and middle school boys and girls in Kanagawa Prefecture, medical examinations of oto-rhino-laryngology and ophthalmology were made by specialists during May and July, 1968. Selection criteria of contaminated degrees were as follows: contaminated area (area I) was where the yearly average of sulfur dioxide concentration was more than 2.0 mg SO2/day/100 sq cm PbO2 and falling soot and dust amounts were more than 100t/sq km/month; and non-contaminated area (area II) was where SO2 concentration was less than 1.0 mg SO2/day/100 sq cm PbO2 and falling soot and dust amounts were less than 6.0 t/sq km/month. Subjects were 3225 boys and girls in area I and 3102 in area II. Examinations of oto-rhino-laryngology were made concerning earwax, otitis media, auris externa, deafness, hypertrophic rhinitis, atrophic rhinitis, other kinds of rhinitis, sinusitis, nasal polyp, deformity of the septum, nasal vestibule disease, nasal vestibule pollution, tonsillar hypertrophy, tonsillitis, adenoids, pharyngitis, and tracheophony. The items which showed a higher rate in area I and which were significantly different from area II were earwax, sinusitis, nasal vestibule diseases, and nasal vestibule pollution; each prevalence rate was 13.8%, 8.2%, 3.7% and 1.8% in area I, and 4.9%, 1.1% and 0.1% in area II. There was a significant difference between area I and area II in the prevalence rate of 4 items of oto-rhino-laryngology. From previous reports or conditions of air pollution, it seemed that school boys and girls in area I had a larger intake of contaminant in the upper respiratory tract compared with those of area II; upper respiratory tract or whole respiratory apparatus seemed to be affected in some degree by the air pollution. Examinations of ophthalmology were made concerning follicular conjunctivitis, chronic conjunctivitis, eczematous blepharitis, pseudotrachoma, tarsal cyst, acute conjunctivitis, hordeolum and trachoma. Follicular conjunctivitis, eczomatous blepharitis, and acute disease were more in area I; chronic conjunctivitis, pseudotrachoma, and tarsal cyst were more in area II, but there was no significant difference between area I and II. The prevalence of diseases was the most in Kawasaki area which belonged to area I, but it seemed that the difference of home environment generally caused ophthalmological diseases.
APTIC-26306

AN INTERIM REPORT ON THE INVESTIGATION OF PUBLIC NUISANCE BY LEAD.

For primary bibliographic entry see Field 04.
APTIC-26310

8. EFFECTS - PLANTS AND LIVESTOCK

CHARACTERISTICS OF PHOTOSYNTHESIS AND OF SOME OTHER PROCESSES IN CONNECTION WITH SMOKE AND GAS RESISTANCE OF TREES AND SHRUBS.

In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Vol. III. The Susceptibility of Resistance to Gas and Smoke of Various Arboreal Species Grown Under Diverse Environmental Conditions in a Number of Industrial Regions of the Soviet Union. M. Y. Nuttonson (ed.), Silver Spring, Md., American Institute of Crop Ecology, 1970, p. 68-69. Translated from Russian. (Also: Okhrana Prirody na Urale, vol. 4:133-135, 1964.
A. S. Sitnikova.
Identifiers: *Trees, *Plant growth, *Combustion gases, Photosynthesis, Toxic tolerances, Ussr, Soils, Dusts, Smokes, Primary metallurgical processing.

Studies were conducted in the Karaganda region of the Kazakh SSR to determine the effects of soil, climate, and air pollution on plant growth, photosynthesis, and the dynamics of chlorophyll and carbohydrate accumulation. The following plants were investigated over a three-year period: European white birch, pinnate elm, common lilac, Tartarian honeysuckle, box elder, balsam poplar, oleaster, Scotch pine, and Siberian pea shrub. In the proximity of an ore-concentrating mill and metallurgical plant, growth of box elder, oleaster, and Siberian pea shrub was accelerated. Gas and dust emissions from these sources intensified the growth of lateral shoots in the balsam popular, oleaster, and pinnate elm and increased the chlorophyll content of the common lilac, oleaster, and pinnate elm. Appreciable gas and smoke pollution hampered photosynthesis in most plants, but enhanced it in the oleaster and pinnate elm. From point of view of oxidizability of cell sap, gas resistance of the plants studied decreases in the following order: pinnate elm, oleaster, balsam poplar, box elder, Tartarian honeysuckle, Siberian pea shrub, common lilac, European white birch, and Scotch pine.
APTIC-24593

THE BIOSYNTHESIS OF STERYL GLUCOSIDES IN PLANTS.

Plant Physiol., vol. 45:255-262, 1970. 23 refs.
Alpaslan Ongun, and J. B. Mudd.
Identifiers: *Plants (botany), *Lipids, *Metabolism, Enzymes, Ph.

The enzymic synthesis of two glycolipids was investigated, in which mitochondrial preparations from pea root, cauliflower inflorescence, and avocado inner mesocarp, and chloroplast preparations from spinach leaf incorporate glucose into steryl glucoside and acylated steryl glucoside when either uridine diphosphate-glucose or uridine diphosphate-galactose is supplied as precursor. Radioactive UDP-galactose or UDP-glucose or both were incubated with the enzyme source and buffer for 60 min at 30 C in centrifuge tubes. Lipids were separated by thin layer chromatography. In the case of pea root mitochondria, galactosyl diglycerides were not formed from either nucleotide sugar. In the case of spinach chloroplasts, only 3% of the metabolized uridine diphosphate-galactose was found as steryl glycosides. Time course experiments indicated that the steryl glucoside is the precursor of the acylated steryl glucoside. The effect of pH on the over-all reaction and analysis of the reaction products suggested that the glucosylation of the sterol has a pH optimum of 8 to 9, and the pH optimum for the acylation of the steryl glucoside is 6.5 to 7. The synthesis of steryl glucoside and acylated steryl glucoside, catalyzed by acetone powders of pea root mitochondria, is stimulated by added sitosterol and stigmasterol. Results on the identification of the two glucosides were in good agreement with previous identifications. (Author abstract modified)
APTIC-24661

SEVERAL TYPES OF SIDE-EFFECTS.

(Nevenwerkingen in soorten). Text in Dutch.
TNO Nieuws, vol. 24:524-527, 1969.
H. Van Genderen.
Identifiers: *Pesticides, *Chlorinated hydrocarbons, Research institutes, Birds, Europe, Soils, Engine exhausts, Water pollution, Dispersion, Tetraethyl lead.

A commission was appointed to study the side-effects of pesticides, with emphasis on environmental pollution due to the dispersal of some of these substances in air, water, soil, and food. The commission was subdivided into a number of study groups: birds and mammals, water, soil, chemical and biochemical transformations. In recent years there has been a high mortality of birds of prey in the Netherlands, which these studies have traced to the use of chlorohydrocarbon insecticides. Reference is made to the dangerous persistence of lead compounds released into the air by the use of tetraethyl lead in motor fuels.
APTIC-24667

REACTION OF TREES AND SHRUBBERY TO AIR POLLUTION IN THE FOREST-PARK BELT OF MOSCOW AND MEASURES FOR EXTENDING THE LIFESPAN OF PLANTS.

In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Volume III. The Susceptibility or Resistance to Gas and Smoke of Various Arboreal Species Grown under Diverse Environmental Conditions in a Number of Industrial Regions of the Soviet Union. M. Y. Nuttonson (ed.) Silver Spring, Md., American Institute of Crop Ecology, 1970, p. 13-22. 4 refs. (Also: Okhrana Prirody na Urale, vol. 4:151-162, 1964.)
A. P. Shcherbakov, and I. F. Cherednichenko.
Identifiers: *Plant damage, *Sulfur dioxide, Trees, Plant growth, Respiration, Metabolism, Ussr, Forests, Soils, Smokes, Absorption.

In viewing the effect of air pollutants on vegetation, two aspects can be brought out: the protective role of green plantings as a shield blocking the penetration of noxious air downwind into the depth of the stand; and the negative physiological effect of mechanical and chemical air pollutants on vegetation. As a result of absorption of sulfur dioxide through the stomata, assimilation is disturbed, photosynthesis lowered, chloroplast iron inactivated, respiration frequently increased, vitamin B destroyed, an unfavorable protein and carbohydrate balance sets in, and the accumulation of silicic acid and strontium in the leaves increases. This is followed by the appearance of external symptoms of disturbed metabolism, injury to leaf tissue, leaf necrosis, all of which affect the growth of the leaf and the increment of the tree's height and diameter. The needles and the growth buds of spruce and pines growing in the smoke-polluted areas of the Moscow forest-park belt are greatly affected by air pollution. Indirect action of noxious gases in the air appears also through the soil, and systematic application of mineral fertilizer is recommended for plantings subject to pollution by acid gases and smoke. Biometric data of pine and spruce needle growth in smoke polluted and smoke-free areas of the Moscow forest-park belt are presented tabularly.
APTIC-24733

GAS RESISTANCE OF PINE AND BIRCH.

In: American Institute of Crop Ecology Survey of USSR Air Pollution Literature. Volume III. The Susceptibility or Resistance to Gas and Smoke of Various Arboreal Species Grown under Diverse Environmental Conditions in a Number of Industrial Regions of the Soviet Union. M. Y. Nuttonson (ed.) Silver Spring, Md., American Institute of Crop Ecology, 1970, p. 51-57. 10 refs. (Also: Okhrana Prirody na Urale, vol. 4:115-122, 1964.)
Yu. Z. Kulagin.
Identifiers: *Trees, *Toxic tolerances, *Meteorology, *Sulfur dioxide, Seasonal, Plant damage, Plant growth, Copper, Ussr, Forests, Mountains, Smokes, Primary metallurgical processing, Winds, Rain, Pressure (atmospheric).

Smoke injury to forests and their destruction under the conditions existing in the Southern Urals are intimately connected with the zonal climatic conditions, and, above all, with the weather during the growth season. European white birch and partly Scotch pine can thrive satisfactorily under conditions of intermittent severe sulfur dioxide attacks of short duration. Their gas resistance is conditioned by the occurrence of these attacks in the second half of the vegetative season. Normally, rainy weather, together with changeable winds and

low barometric pressure, occurs in July and pushes the noxious gases down close to the ground. Westerly winds prevail in the area under consideration, in the environs of the city of Karabash and its copper smelter. The growth and formation of shoots is almost complete during May and June; the absence of the so-called biological gas resistance but high drought and frost resistance of defoliated birch and pine shoots insures their viability in late summer, autumn and winter, and resurgence of vegetative processes the following season.
APTIC-24734

BIOLOGICAL SYSTEMS FOR THE IDENTIFICATION AND DISTRIBUTION OF AIR POLLUTANTS.

In: Problems and Control of Air Pollution. F. S.
Mallette (ed.), New York, Reinhold, 1955, Chapt.
7, p. 64-68. 9 refs.
John T. Middleton.
Identifiers: *Plant indicators, *Oxidants, Pinto beans, Plant damage, Plant growth, Inhibition, California, Monitoring, Instrumentation, Hydrocarbons, Ozone.

The response of plants as a biological system to air pollution is a convenient method for (1) recognizing the presence of contaminants, (2) determining distribution of pollutants, (3) providing a passive collection system for subsequent chemical analysis, and (4) assisting in an estimate of the level of pollution. Among the more important limitations of the method are the nonspecific response of some plants to certain chemically different airborne constituents, and the effect on plant response of environment prior to and during plant exposure. Several examples are given of plant observations substituting for or supplementing instrumental monitoring and recording methods. A study of the relation between plant damage and oxidant level was aided by knowledge of plant response to ozone and oxidized hydrocarbons; evaluation could not have been made with instrumentation alone since the machine (an oxidant analyzer) apparently cannot distinguish between the two oxidants. A summary of data is given on the geographic distribution of phytotoxic oxidants for the southern California coastal basin, and the question of the growth suppressant effect of atmospheric oxidants on plants is briefly noted.
APTIC-24766

PLANT GROWTH AND LABORATORY ATMOSPHERE.

(Pflanzenwachstum und laboratoriumsluft). Ber.
Deut. Botan. Ges., vol. 21:180-194, 1903. 35 refs.
Translated from German. Belov and Associates,
Denver, Colo., 29p., June 10, 1970.
Oswald Richter.
Identifiers: *Controlled atmospheres, *Plant growth, Vegetables, Respiration, Charcoal, Germany, Fuel gases, Absorption, Acetylenes, Ethylene, Mercury compounds, Carbon monoxide, Oxygen.

A series of experiments designed to determine the effect of reduced oxygen or increased carbon monoxide on plant growth is described. The results of the experiments indicate that gaseous impurities in the atmosphere may have significant effects on the rate of plant growth. Another series of experiments is conducted to determine the specific effects of coal gas, particularly acetylene and ethylene, on the growth of certain vegetables. The results indicate that coal gas has an inhibiting effect on the growth in length and that it promotes the growth in thickness. A simple gas absorption system utilizing charcoal decreases the influence of coal gas. The shortening and thickening of affected plants is proportional to the amount of coal gas and to the duration of exposure. The effects of reduced oxygen partial pressure and plant respiration on plant growth include nutations of 130-270 deg. Mercury vapor can produce similar differences in growth as coal gas, however, it kills the plants within a short time.
APTIC-24773

SOME DATA ON THE WATER BALANCE IN PLANTS IN THE PRESENCE OF FLUOR IN THE SUBSTRATE.

(Beitrag zur Kenntnis der Wasserhaushalt der
Pflanzen bei Anwesenheit des Fluors im Substrat).
Air Pollution Proc. First European Congr.
Influence Air Pollution Plants Animals,
Wageningen, Netherlands, 1968, p. 91-97.
Translated from German. Belov and Associates,
Denver, Colo., 7p., Oct. 28, 1970.
J. Navara.
Identifiers: *Fluorides, *Water balance, *Plant damage, *Soils, Czechoslovakia, Sodium compounds.

Studies were conducted of the water balance of the Senator variety of Pisum sativum in the presence of fluor (in the form of sodium fluoride) in the substrate. The effect of fluor was seen in a withering of those portions of the plant above the soil. The unfavorable hydration condition observed is the result of changes in the amount of water assimilated and the amount given off. The presence of fluor first stimulated and then reduced the amount of water given off. No preliminary increase was noted before the amount of water taken in was reduced, and plants assimilated no water after 68 hrs in the presence of 0.29 and 0.25 g/l F. A balance between the amount of water taken in and given off was reached only after approximately 27 hrs at a level of approximately 40% of the original transpiration and approximately 90% of the original water content of the plant.
APTIC-24787

POLLUTION OF CULTIVATED PLANTS WITH LEAD FROM AUTO EXHAUST.

(Verunreinigungen von Kulturpflanzen mit Blei
aus Kraftfahrzeugabgasen). Air Pollution Proc.
First European Congr. Influence Air Pollution
Plants Animals, Wageningen, Netherlands, 1968,
p. 259-268. Translated from German. Belov and
Associates, Denver, Colo., 15p., Nov. 2, 1970.
A. Kloke, and H. O. Leh.
Identifiers: *Lead compounds, *Plants (botany), *Engine exhausts, *Absorption, Germany, Highways, Subways.

Plant samples from areas adjacent to and remote from dense traffic were analyzed for lead. The lead content of the green parts of plants increased with increasing closeness to well-travelled highways and streets. Even in the vicinity of highways, no increase was noted in lead concentrations in below-ground and inner portions of plants. The lead content of feed plants growing along roads was far in excess of the suggested tolerable concentration of 10 ppm. For the protection of humans and cattle, cultivation of food and forage plants along roadways should be abandoned or the use of tetraethyl lead in fuel prohibited.
APTIC-24788

THE RELATIONSHIPS OF OZONE, LOPHODERMIUM PINASTRI AND PULLULARIA PULLULANS TO NEEDLE BLIGHT OF EASTERN WHITE PINE.

Cornell Univ., Ithaca, N. Y., Dept. of Plant
Pathology, Thesis (Ph.D.), Ann Arbor, Mich.,
Univ. Microfilms, Inc., 1968, 176p. 113 refs.
Arthur Charles Costonis.
Identifiers: *Needle blight, *Fungi, *Ozone, Trees, Plant damage, Plant growth, Toxic tolerances, Exposure methods, Meteorology, Humidity, Temperature (atmospheric).

The individual and combined roles of ozone and the needle fungi, Lophodermium pinastri and Pullularia pullulans were studied in the field and under controlled laboratory conditions to assess their role in needle blight of eastern white pine. In symptomatology and etiology, ozone injury on eastern white pine has much in common with emergence tipburn, chlorotic dwarf, red needle and yellow dwarf blight. Characteristic symptoms include flecking, spotting, banding, tip necrosis, dwarfing, premature casting of needles and slower growth of genetically susceptible trees. Ozone injury simultaneously induced a variety of symptoms on different white pines according to their inherent sensitivities and seasonal trends in sensitivity. Three grades of sensitivity were recognized. Factors which favored ozone injury were high temperatures, high relative humidity, bright sunlight during and after fumigation, and free moisture on the needles during exposure. Needles were most sensitive to ozone injury from about one week after needle emergence until they were about six weeks of age. In 1967, a year of relatively high ozone concentration, more injury occurred than in 1966, a year of relatively low ozone concentrations. New needles of sensitive trees protected from the ambient atmosphere by means of polyethylene bags or by growing the trees in a charcoal-filtered air environment remained healthy. As a result of artificial inoculations of attached and detached needles, Pullularia pullulans only invaded tissue previously killed by ozone while Lophodermium pinastri infected both fumigated and non-fumigated sensitive and tolerant needles. Spores of L. pinastri usually germinate by the production of appressoria which becomes thick-walled and melanized. Apparently the fungus penetrates the cuticle directly, as no stomatal penetration was observed. The greatest impact of needle blight on eastern white pine is probably on growth rate and associated fibre production. (Author summary modified)
APTIC-24796

EXPERIMENTAL STUDY OF THE EFFECT OF NITROGEN DIOXIDE ON PLANTS.

(Experimentelle Untersuchungen ueber die
Wirkung von Stickstoffdioxid auf Pflanzen). Text
in German. Landesanstalt fuer Immissions- und
Bodennutzungsschutz des Landes Nordrhein-
Westfalen, Essen (West Germany), Rept. 7, p. 50-
70, 1967. 25 refs.
H. Van Haut, and H. Stratmann.
Identifiers: *Plant damage, *Nitrogen oxides, Plants (botany), Necrosis, Plant growth, Photosynthesis, Thresholds, Toxic tolerances, Germany, Sulfur oxides.

The effect of nitrogen dioxide on plants was measured in climatic chambers and compared with that of sulfur dioxide. The leaf damage caused by NO2 and NO was largely identical with the damage caused by sulfur dioxide both in its effect on colour and by the pattern of the damage. In dicotyledons, the gas damages intercostal fields and leaf rims; in monocotyledons, leaf damage takes on the form of yellow and white necroses, conifers manifest uniformly red and brown colouring. The slight differences manifested in NO2 and SO2 damage do not permit to differentiate between the two gases. Whether chemical leaf analysis can be used to determine damage caused by NO2 is as yet unresolved. The grouping of plant species by their degree of resistence to NO2 is largely identical with that to SO2. The sensitivity of plants to NO2 is the same during the day as at night while the same plants are more resistant to SO2 at night than during the day. The resistance of plants to NO2 varies considerably with their growth period and the age of leaves is decisive for the degree and type of damage incurred. The damage threshold for annual plants is approximately 0.8 mg NO2/cu m air.
APTIC-24808

ON THE INTERCELLULAR NITRATE IN THE LEAVES AND ROOTS OF BARLEY.

(Sur la localisation intracellulaire de la nitrate
reductase dans les feuilles et les racines d'orge).
Physiol Veg., 5 (3):271-291, 1967. 15 refs.
Translated from French. Belov and Associates,
Denver, Colo., 30p., Sept. 3, 1970.
M. Coupe.
Identifiers: *Barley, *Nitrates, *Reduction, Leaves, Chloroplasts, Cells, Enzymes, France.

An estimate is made of the relative importance of the reduction of nitrate in the chloroplasts in the

mitochondria and the cytoplasm of barley leaves. Because of varying results with different methods of preparation of the cell organites, two techniques are used. The first involves immersion in an aqueous medium, from which it is possible to obtain a fraction which is rich in granules whose outer membranes are intact. The second method, using lyophilized leaves with centrifugation according to density, yields chloroplasts which retain their enzymes and other hydrosoluble factors, although various liposoluble factors can be lost. In chloroplasts obtained by the first method, the activity of nitrate reductase is very weak. The second method permits calculations that indicate these organites contain about 60% of the activity present in the leaf. The nuclear and mitochondrial fractions and the roots contain little nitrate reductase. Cytoplasm is always abundant in this enzyme. The addition of molybdenum to the aqueous types does not increase their activity. (Author summary modified)
APTIC-24850

ORIGINAL TREATISES CONCERNING THE USABILITY OF THE SPECTROSCOPIC PHAOPHYTIN-TEST IN SMOKE-DAMAGE DIAGNOSIS.

Prussian Inst. for the Hygiene of Water, Soil and
Air, Berlin-Dahlem (Germany), Dept. of Biology,
p. 258-273, 1932. Translated from German. 18p.
Wilhelm Dorries.
Identifiers: *Pheophytin, *Plant damage, *Smokes, Chloroplasts, Germany, Spectrometry.

Because of the unreliability of chemical methods for determining whether acid smoke gases have damaged chlorophyll-containing plant tissues, numerous investigations were conducted to determine the practicability of the spectroscopic pheophytin test. Specific goals of the experiments were to test if pheophytin can be created by experimental exposure to gas, if pheophytin is created by damages in open spaces containing no source other than acid smoke gas, and if leaf staining and color changes can exist where damages have not been caused by acid smoke gas. As determined by several hundred samples, the effect of acid smoke gases can, once the 'characteristic' leaf stains occur, be identified as 'smoke damages' by the spectroscopic pheophytin test. However, the method fails when chlorophyll-carrying cells have been damaged by very weak concentrations of sulfurous acid to the extent that full bleaching of the chlorophyll coloring occurs. It is also important to distinguish acid damage from symptoms of water shortage, sunburn, so-called frost drying and from typical autumn coloring.
APTIC-24851

COMPARISON OF THE EFFECTS OF SULPHUR DIOXIDE AND OF THE DERIVATIVES OF FLUORINE ON A FEW PLANTS.

(Action Compare de l'anhydride sulfureux et des
derives fluores sur quelques vegetaux). Proc.
Intern. Clean Air Cong., London, 1966 (Part I), 6
(5):171-173. Translated from French. Belov and
Associates, Denver, Colo., 9p., Sept. 9, 1970.
L. De Cormis.
Identifiers: *Tomatoes, *Absorption, *Fluorine compounds, *Sulfur dioxide, Plant damage, Necrosis, Metabolism, Toxic tolerances.

The frequent absence of a correlation between plant damage and air pollution in the vicinity of a plant emitting 400 tons per day sulfur dioxide and 150 kg per day fluorine led to studied of the nature of the absorption of both pollutants in plants. Both fluorine and sulfur dioxide are absorbed by leaves of tomato plants in proportion to the amount applied. However, absorbed sulfur migrates within the plants and is distributed as the sulfur normally found in plants. Fluorine is accumulated by the leaves, resulting in eventual necrosis beyond a certain limit; these limits have to be separately defined for each species of vegetation. Because sulfur is metabolized in part by the plant, it cannot have a cumulative toxic effect when applied in subtoxic quantities.
APTIC-24852

SOME PECULIARITIES OF THE SUSCEPTIBILITY OF SCOTCH PINE TO SULFUR DIOXIDE INJURY.

In: American Institute of Crop Ecology Survey of
USSR Air Pollution Literature. Vol. III. The
Susceptibility or Resistance to Gas and Smoke of
Various Arboreal Species Grown Under Diverse
Environmental Conditions In a Number of
Industrial Regions of the Soviet Union. M. Y.
Nuttonson (ed.), Silver Spring, Md., American
Inst. of Crop Ecology, 1970, p. 45-50. 12 refs.
Also: Tr. Inst. Ekol. Rast. Zhivotn., Ural. Filial,
Akad. Nauk SSSR, vol. 2:203-207, 1968.
S. A. Mamaev, and V. S. Nikolaevskiy.
Identifiers: *Scotch pine, *Plant damage, *Sulfur dioxide, Trees, Ussr.

Experiments were undertaken to determine the effect of sulfur dioxide on thirty-day-old sprouts of pine seeds that were obtained from different maternal specimens. The susceptibility of a sprout to gas injury was found to be inversely correlated with the degree of development of the sprout. No definite correlation was observed between the morphophysical characteristics of the parent tree, its seed, and the susceptibility of the sprout to injury. As a result of unequal conditions, different microenvironments,and possible genetic segration, there was great variability of sprout injury within individual families. Therefore, while the coefficient of variation for the entire group is 39.6%, the value is even higher within separate families. Seedling damage tended to decrease with plant size and availability of water. The effect of sulfuric acid fumes manifested itself mainly in damage to cotyldedons; chlorophyll A and B were converted to phaeophytin, carotene was almost completely destroyed, and violaxanthin was partly destroyed. The most resistant xanthophyll was lutein.
APTIC-24853

THE EFFECT OF SPECIFIC INDUSTRIAL GASES ON THE GROWTH OF SOME TREE SPECIES.

In: American Institute of Crop Ecology Survey of
USSR Air Pollution Literature. Vol. III. The
Susceptibility or Resistance to Gas and Smoke of
Various Arboreal Species Grown Under Diverse
Environmental Conditions in a Number of
Industrial Regions of the Soviet Union. M. Y.
Nuttonson (ed.), Silver Spring, Md., American
Inst. of Crop Ecology, 1970, p. 9-12. 5 refs. Also:
Botanika, no. 5:150-154, 1963.
V. G. Antipov.
Identifiers: *Trees, *Plant growth, *Gases, Ussr, Acetic acid, Methanes, Ethylene, Acetone, Nitrogen oxides.

English oak, English hawthorne, and Tartarian dogwood were studied for the effect of methane, ethylene, acetone, and acetic acid on the annual growth increment of shoots; and poplars and birches were studied for the effect of nitrogen oxides (from a factory producing nitrates) on the annual increment in trunk diameter. Exposure to gases was found to retard the growth of the shoots in which growth processes are usually most intense. The annual increment in trunk thickness declined greatly in young trees in the second year of exposure to nitrogen oxides, but not before the third year in older trees. However, the older trees failed to grow again after production of nitrates stopped, while the young trees recovered and later showed considerable growth.
APTIC-24864

THE INFLUENCE OF SMOKE AND GAS ON THE FLOWERING AND FRUITING OF SOME TREES AND SHRUBS.

In: American Institute of Crop Ecology Survey of
USSR Air Pollution Literature. Vol. III. The
Susceptibility or Resistance to Gas and Smoke of
Various Arboreal Species Grown Under Diverse
Environmental Conditions in a Number of
Industrial Regions of the Soviet Union. M. Y.
Nuttonson (ed.), Silver Spring, Md., American
Inst. of Crop Ecology, 1970, p. 3-8. 3 refs. Also:
Sb. Bot. Rab., Belorusa. Otd. Vses. Bot
Obshchest., no. 2: 167-172, 1960
V. G. Antipov.
Identifiers: *Trees, *Smokes, *Gases, Flowers, Fruits, Ussr.

Twenty-five species of trees and shrubs were examined for the effect of chemical plant smoke and gas emissions on fruiting and flowering. Flowering was satisfactory for the majority of species. Although significant quantitative decreases in the number of flowers occurred in the common birch, pedunculate oak, snowy mespilus, and cluster bird cherry, complete absence of flowering was observed only with the balsam poplar. Gas and smoke exhibited a stronger influence on fruiting, with fruiting completely absent on the birch, Russian elm, pedunculate oak, round-leaved serviceberry, Japanese rose, Urals false spirea, black currant, balsam poplar, and cluster bird cherry. In addition, there was a significant decrease in fruit in Tartar dogwood, European barberry common hawthorne, red berry elder, ledge cotoneaster, Norway maple, speckled alder, mountain ash, and sweet mock orange.
APTIC-24865

THE EFFECT OF INDUSTRIAL GASES AND INDUSTRIAL SMOKE ON VARIOUS FOREST SPECIES.

In: American Institute of Crop Ecology Survey of
USSR Pollution Literature. Vol. III. The
Susceptibility or Resistance to Gas and Smoke of
Various Arboreal Species Grown Under Diverse
Environmental Conditions in a Number of
Industrial Regions of the Soviet Union. M. Y.
Nuttonson (ed.), Silver Spring, Md., American
Inst. of Crop Ecology, 1970. p. 1-2. Also: General
Forestry Second Edition, (Obshchee lesovodstvo.
Vtoroe isdanie). Moscow (USSR), Kolos, 1968, p.
215-217.
P. S. Pogrebnyak.
Identifiers: *Conifers, *Plant damage, *Sulfur dioxide, Trees.

The problem of protecting forests against industrial gases primarily concerns evergreen conifers, whose leaves are continuously poisoned and usually dead in the second year. Evergreen conifers damaged by sulfur dioxide also suffer partial loss of current leaves along the edges of the crown, and this in turn causes thin foliage. Resistant conifer species that are recommended for growing under conditions of moderate air pollution are larch, Colorado spruce, Engelmann's spruce, Serbian spruce, arborvitae, junipers, lodgepole pine, and false cypress.
APTIC-24866

CURRENT CONDITIONS AND SCIENTIFIC PROBLEMS IN STUDYING THE INJURIOUS EFFECTS OF INDUSTRIAL POLLUTANTS ON PLANTS AND IN DEVELOPING METHODS FOR CONTROLLING THEM IN THE URALS.

In: American Institute of Crop Ecology Survey of
USSR Air Pollution Literature. Vol. III. The
Susceptibility or Resistance to Gas and Smoke of
Various Arboreal Species Grown Under Diverse
Environmental Conditions in a Number of
Industrial Regions of the Soviet Union. M.Y.
Nuttonson (ed.), Silver Spring, Md., American
Inst. of Crop Ecology, 1970, p. 23-32. 8 refs. Also:
Tr. Inst. Ekol. Rast. Zhivotn., Ural. Filial, Akad.
Nauk SSSE, no. 4:7-18, 1964.
S.A. Mamaev.
Identifiers: *Plant damage, *Industrial areas, *Mountains, Proposals, Research programs, Ussr, Dusts, Gases.

The deleterious effects of gaseous pollutants and dusts on vegetation are discussed with special reference to the increasing industrilization of the Urals. While studies have been carried out in the region on gas resistance in plants and on the effect

of dust pollution in wood plants, they have been fragmentary and the problem of plant protection remains unsolved. Development of plants resistant to air pollution will require the following: formulation of a general theory of gas and dust resistance in plants; investigation of soil formation and plant cover of dumps, ash piles, excavation waste, disturbed ground, and fills; investigation of plant nutrition under conditions of increased salt content and of changed water and air conditions; elaboration of plant and plant group classification under conditions of heavy air and soil pollution; methods of evaluating air and soil pollution in relation to the suitability of the polluted environment for growing various species of plants; and investigation of industrial pollution on microorganisms and fauna in verdant plantings of surburban belts as related to possible changes in the biocoenosis.
APTIC-24867

ANTHOCYANIN FORMATION AS A RESPONSE TO OZONE AND SMOG TREATMENT IN RUMEX CRISPUS L.

Plant physiol., vol. 42:1023-1024, 1967. 17 refs.
Jane Koukol, and W. M. Dugger Jr.
Identifiers: *Dock plants, *Discoloration, *Smog, *Anthocyanin, Plants (botany), Plant damage, Ozone.

The red coloration that appears on the leaves of dock plants (Rumex crispus L) after exposure to smog or ozone was due to the appearance of an anthocyanin. The anthocyanin was isolated from the leaves of smog-treated plants, purified, and identified only as a cyanidin glucoside. The leaves of untreated plants did not contain detectable anthocyanin, nor did chlorosis occur in the treated plants. (Author summary modified)
APTIC-24883

SULPHUR COMPUNDS IN KRAFT PULP MILL EFFLUENTS.

For primary bibliographic entry see Field 01.
APTIC-24902

INFORMATION ON DAMAGE CAUSED BY AIR POLLUTION TO THE PLANTS AND ANIMALS IN EUROPEAN COUNTRIES.

(Informations sur les dommages causes par la
pollution de l'air aux plantes et aux animaux dans
les pays europeens). Air Pollution Proc. 1st
European Congr. on the Influence of Air Pollution
on Plants and Animals, Wageningen, The
Netherlands, 1968, p. 15-26. Translated from
French. Belov and Associates, Denver, Colo.,
Sept. 3, 1970.
J. Bossavy.
Identifiers: *Animals, *Plant damage, *Europe, *Fluorine compounds, *Sulfur dioxide, Forests, Soils.

All specialists agree that sulfur dioxide and fluorine compounds are particularly important plant toxins. Picea abies, Abies alba, and Pinus sylvestris, by far the most important trees cultivated in Central Europe, are highly susceptible to these two pollutants. The damage caused by them reaches alarming proportions, endangering the existence of forests in many areas. The total area of damaged forests probably approaches 400,000 hectares. Damages to land under cultivation are less spectacular because growing conditions can be artificially improved. Pollution effects are often limited to the yield or partial loss of quality for one growing season. The influence of fluorine on animal teeth and bones is well known: the effects can be partly averted by adding correct amounts of phosphate and calcium to animal rations or by supplying feed containing sufficient minerals. In general, research on the effect of pollutants on vegetation is directed toward the absorption of pollutants, their transport in leaf parenchyma, and their effects on physiological processes. Creation of new species or varieties of domestic plants capable of supporting high pollution levels seems possible. (Author abstract modified)
APTIC-24933

LEVELS OF TOXICITY TO ANIMALS PROVIDE SOUND BASIS FOR FLUORIDE STANDARDS.

Environ. Sci. Technol., 3 (8):721-726, Aug. 1969. 4 refs.
James L. Shupe.
Identifiers: *Toxicity, *Fluorosis, Animals, Cattle, Treatment and aids, Diagnosis, Bones, Circulatory system, Skin, Tissues, Ingestion, Reproduction, Fluorine compounds, Aluminum compounds, Calcium compounds.

Results of controlled fluorosis experiments and clinical experience with more than 77,000 animals in enzootic fluorosis areas confirmed that factors which govern the reactive processes of animals ingesting fluorides include the level or amount of fluoride ingested, duration of ingestion, the type and solubility of fluoride ingested, age of animal at time of ingestion, level of nutrition, stress factors, and individual biological response. Normally, birds are more resistant than mammals to the toxic effects of fluoride ingestion, and rodents tend to be more resistant than larger animals on a body weight basis. Signs and symptoms of acute and chronic fluorine toxicosis are described. Both enamel and dentine are affected by elevated levels of fluoride ingestion during the formative stages of the tooth. The degree of dental fluorosis can be correlated with the amount of fluoride in the bones, degree of osteofluorosis, duration of exposure, age of animal during fluoride ingestion, amount of fluoride ingested during tooth formation, and other reactive processes of the body. Effects of fluoride on bones are discussed; the most consistent measurement of fluorosis is the amount of fluoride retained in the normal mineralizing matrices of the body. It appears that three mechanisms are involved in abnormal bone formation: impairment of the mechanical properties of normally formed bones by excessive fluoridation; precocious remodeling and excessive proliferation; and direct inhibition of normal osteoblastic activity by excessive blood and tissue fluid levels of fluoride. For dairy cattle that received 93 or 49 ppm of fluoride for 7-1/2 years, observations are included for the hair and skin, hoofs, soft tissues, blood, placental transfer, reproduction, and milk production. Aluminum sulfate, aluminum chloride, calcium aluminate, calcium carbonate, and defluorinated phosphate have reduced the toxicity of fluoride in animals.
APTIC-24944

AIR AS A SOURCE OF LEAD IN EDIBLE CROPS.

Environ. Sci. Technol., 4 (3):226-230, March 1970.
19 refs. (Presented at the American Chemical
Society National Meeting, 157th, Symposium on
Air Conservation and Lead, Minneapolis, Minn.,
April 1969.)
Haar Ter.
Identifiers: *Crops, *Lead compounds, Foods, Plants (botany), Vegetables, Greenhouses, Highways, Soils, Engine exhausts, Filters, Absorption, Ph.

The effect of airborne lead on the lead concentration of the edible and nonedible portions of several important types of food crops was studied by growing crops in greenhouses supplied with filtered and ambient air, and in plots planted in long rows perpendicular to a busy highway. Of the ten crops studied--wheat, potatoes, tomatoes, sweet corn, carrots, oats, cabbage, rice, leaf lettuce, and snap beans--eight were not affected by the concentration of lead in the air. Leaf lettuce was the only crop studied in the greenhouse whose edible portion had a statistically higher lead concentration when grown in unfiltered air than when grown in filtered air. The cob of sweet corn contained a higher concentration than the kernel. In contrast to the greenhouse plants, however, soybeans and snap beans showed higher lead concentrations when grown near the road. The pH of the soil may have been a factor. Inedible portions of the plants, such as corn husks, wheat, and oat chaff, soybean hulls and the broad, normally harvested, outer leaves of cabbage contained two to three times higher concentrations of lead when grown near the road, compared with further away. Lead occurring naturally in the soil was concluded to be the main source of lead in the edible portion of the crops studied, while airborne lead, based on the crops studied, contributes 0.5 to 1.5% of the lead content of the U. S. diet. To evaluate the significance of these conclusions, several questions were considered: how critical was the design of the experiment relative to the problem at hand; how complete were the data; and how meaningful were the conclusions arrived at when placed in a general context. (Author abstract modified)
APTIC-24947

CAN STOMATA PLAY A PART IN PROTECTING PLANTS AGAINST AIR POLLUTANTS"

Environ. Pollut., vol. 1:149-154, 1970. 11 refs.
T. A. Mansfield, and Ondrej Majernik.
Identifiers: *Stomata, *Carbon dioxide, *Sulfur dioxide, Plants (botany), Plant damage, Great britain, Humidity, Reaction mechanisms.

The stomatal closing reaction to carbon dioxide seems to be of wide occurrence among plant species, though the magnitude of the effect does vary and the stomata of some crops, such as tomato and cotton, seems to be relatively insensitive to CO2. Usually, however, the stomata begin to close when the CO2 concentration rises slightly above the normal 300 ppm, and open widely when it falls below this figure. The concentration of CO2 also tends to increase as the concentration of other pollutants increases; the stomatal closure in response to CO2 should offer the plant some protection against the dangerous pollutants. With a suitable selection program, it is reasonable to suppose that crop varieties could be produced with enhanced stomatal responses to CO2. Studies with broad bean have revealed two kinds of stomatal reaction to sulfur dioxide, which depend on the relative humidity of the atmosphere. The effect which is probably of most significance occurs when the relative humidity is greater than 40% at 18 C; it involves an opening of the stomata to much wider apertures than normal. An important question to be answered in future research is whether there is any possibility of preventing such abnormal opening of stomata.
APTIC-25536

RESPIRATORY DAMAGE DUE TO ATMOSPHERIC POLLUTANTS IN THE ENGLISH SPARROW, PASSER DOMESTICUS.

In: Project Clean Air. California Univ., Davis,
Dept. of Pathology, California Univ. Res. Proj. S-
21, 4p., Sept. 1, 1970.
S. R. Wellings.
Identifiers: *Respiratory diseases, *Urban areas, *Birds, Pathological techniques, Autopsy, Cells, Liver, Lungs, Anthracosis, California, Non-urban areas.

Eighty-four birds, mostly English sparrows, were collected at Davis, Sacramento, and the California coast north of Bodega Bay for approximately 100 miles. All birds were autopsied, and samples of lung, heart, liver, kidney, skin, gastrointestinal tract, pancreas, gonad, skeletal muscle, spleen, and brain were fixed in formalin and stained with hematoxylin and eosin for histopathological studies. Other samples of lung, liver, and kidney, and the remainder of the carcass were placed in polyethylene bags and frozen for future analysis for heavy metals. Careful study of a subsample of 6 birds from the three collecting sites indicate that pulmonary anthracosis and cytoplasmic fat vaculation in some hepatic parenchymal cells are prominent in birds collected in Davis and Sacramento, but absent in birds collected at the coast. (Author abstract)
APTIC-25577

CYTOGENIC EFFECTS OF FLUORIDE: TECHNICAL PROGRESS REPORT.

Texas Agricultural and Mechanical Univ., College Station, Research Grant AP 00447, 6p., 1969 (*). 13 refs.
Gary E. Hart.
Identifiers: *Fluorides, *Plant growth, *Cytogenic effects, Plant damage, Nucleic acids, Mutations.

Chromosomal, miotic, and mitotic abberations observed in plant roots, leaves, and seedlings exposed to sodium fluoride and hydrogen fluoride are reported. Treatment with HF suggested that the compound is a mutagenic agent that probably blocks replication of DNA. The different types of mitotic abberations caused by sodium fluoride treatment were cured by recovery treatment with 0.002 sodium pyrophosphate. This suggests that fluoride may form an inactive fluoropyrophosphate complex, the activities of which could be expected to inhibit mitotic rates as a result of DNA depolymerization. The addition of glycine to NaF caused a very marked reduction in the frequency of NaF-induced abberations. Plant growth was also inhibited by dimethyl-sulfoxide, ethyl-methane-sulfonate, and colchicine.
APTIC-25618

LICHENS AS AN INDICATOR OF AIR POLLUTION.

Preprint, Hawaii Univ., Honolulu, 6p., 1968.
C. W. Smith.
Identifiers: *Lichens, *Plant indicators, *Urban areas, Trees, Toxicity, Hawaii, Engine exhausts, Stack gases, Microorganisms, Humidity, Rain, Temperature (atmospheric), Sulfur dioxide.

The population density of lichens in urban areas depends upon the relative humidity and temperature, the removal of the indigenous population during construction, and air pollutants. The results of a study conducted in three principle areas in Hawaii to determine the lichen population are presented. The effects of sulfur dioxide and automobile-associated pollutants are noted, along with rainfall and other significant factors. The effect of the 'city desert climate' results from an increase in asphalt-covered ground, causing more extreme temperatures and lower relative humidities than are normally found in natural areas. There is no apparent mechanism whereby lichens can excrete or detoxify subetances which are not part of their normal atmosphere or substrate. The occurrence of lichens on various types of trees in the areas investigated are tabulated.
APTIC-25655

BIOCHEMICAL PHENOMENA IN THE SOIL IN EXHALATION AREAS.

(Biochemische Phenomane in Boden Exhalationsgebiete.) Air Pollution Proc., First European Congr. Influence Air Pollution Plants Animals, Wageningen, 1968, p. 33-39. 24 refs.
Translated from German. Belov and Associates, Denver, Colo., 7p., Nov. 3, 1970.
F. Pesek.
Identifiers: *Plant growth, *Soils, Thresholds, Toxicity, Czechoslovakia, Industrial emission sources.

To study the problems connected with soil poisoning, it is necessary to know the concentration of substances emitted from the suspected industrial sources and the amount of exposure time. Chemicals which were found in quantities between 0.01 and 1.9% in diseased soil in the region of Bohemia are presented tabularly. Toxicity limits and physiological thresholds are necessary to provide a prognosis and therapy in emission areas. An equation is provided indicating the sterility of the soil toward vegetation.
APTIC-25660

THE INFLUENCE OF FLUORINE EXHALATION ON THE FLORA IN THE SURROUNDINGS OF AN ALUMINUM PLANT.

(Der Einfluss von Fluorexhalaten auf die Pflanzenwelt in der Umgebung eines Aluminumwerkes. Air Pollution Proc., First European Congr. Influence Air Pollution Plants Animals, Wageningen, 1968, p. 173-178.
Translated from German. Belov and Associates, Denver, Colo., 5p., Nov. 3, 1970.
A. Rippel, and J. Janovicova.
Identifiers: *Plant damage, *Fluorine compounds, Plant indicators, Czechoslovakia, Primary metallurgical processing, Winds, Aluminum compounds.

Examinations of the forest vegetation and agricultural life in the surroundings of an aluminum plant over a period of six years revealed intoxication and injuries to the vegetation by fluorine compounds. The degree of injury differed in correlation with the distance from the plant and the prevailing wind direction. Further studies revealed that plums were a more sensitive indicator to fluorine pollution than apples, pears, cherries, and grapes. Among vegetables the most striking differences were noted with leaf vegetables such as lettuce and cabbage. Wheat showed higher fluorine contents than rye. (Author summary modified)
APTIC-25661

THE EFFECT OF PLANTS OF A COMBINATION OF SUBACUTE AND TOXIC SULFUR DIOXIDE DOSES.

Staub (English translation from German of: Staub, Reinhaltung Luft), 30 (4):20-23, April 1970. 8 refs.
Richard Zahn.
Identifiers: *Sulfur dioxide, *Plants (botany), *Immunology, Alfalfa, Barley, Wheat, Trees, Plant damage, Treatment and aids, Germany.

Alfalfa plants were found able to withstand interim loads (i.e., loads between really toxic doses) of 0.1 to 0.2 ppm sulfur dioxide. Pretreatment of the plants with 0.2 ppm SO2 prior to toxic doses slightly reinforced the effect of the latter. Barley plants pretreated with 0.3 and 0.6 ppm showed no damage at all after exposure to 1.2 ppm SO2. Wheat pretreated with 0.4 ppm SO2 showed reduced damage from exposure to 0.8 ppm SO2. Larch also showed a positive pretreatment reaction. The positive effects of pretreatment were observed only for daytime fumigation. For monootyledons and some conifers, subacute fumigations appear to be an immunization process through which certain oxidases are reformed or reactivated. The oxidation of these oxidases accelerates the decontamination of the SO2 introduced into the cell by the toxic doses.
APTIC-25662

THE EFFECT OF FLUORINE EXHALATION ON ANIMALS IN THE SURROUNDINGS OF AN ALUMINUM PLANT.

(Der Einfluss von Fluorexhalaten auf die Tiere in der Umgebung einer Aluminiumfabrik). Air Pollution Proc., First European Congr. Influence Air Pollution Plants Animals, Wageningen, 1968, p. 275-279. Translated from German. Belov and Associates, Denver, Colo., 5p., Nov. 3, 1970.
G. Balazova, and E. Hluchan.
Identifiers: *Fluorine compounds, *Animals, *Fluorosis, Birds, Cattle, Health impairment, Czechoslovakia, Primary metallurgical processing, Sampling methods, Aluminum compounds.

In the vicinity of an aluminum plant, the presence of fluor was examined in the air as well as in the organs of house sparrows and pigeons. The fluor in milk and eggs produced in the immediate vicinity was simultaneously determined. To a various extent and in the majority of samples, a significant increase of fluor contents was observed. The first evidence of damaging results was fluorosis in the cattle. (Author summary modified)
APTIC-25665

THE PATHODYNAMICS OF HEMOPOIESIS SUPPRESSION BY NITROUS OXIDE.

Anesthesia Analgesia Current Res., 45 (4):461-466, July-Aug. 1966. 19 refs. (Includes a reply by Bradley E. Smith.)
Robert D. Barnard.
Identifiers: *Hemopoiesis, *Inhibition, *Nitrous oxide (n20), Leukemia, Carcinogens, Nitrites, Nitrous oxide (n2o), Ions, Reaction mechanisms.

In response to Dr. Bradley E. Smith's work on the effect of nitrous oxide on chick embryos, and his most recent paper on the terategenic effects of nitrous oxide, the author traces his interest in the pathodynamics of hemopoiesis suppression. This extends from thoughts in 1927 concerning the isosterism of nitrous oxide and carbon dioxide, to the 1960's where he postulates that nitrous oxide leukemogenesis is a form of carcinogenesis because a depressed rate of cell division is a hallmark of all autochthonous human cancer. Once formed, the hyponitrite ion will enter into as strong a combination with ferrihemes as will the analogous mitochondrial poisons: fluoride, cyanide, or hydrosulfide. The Boltzmann distribution is of prime importance in medicine, and a thesis linking entropy with carcinogenesis is mentioned.
APTIC-25667

TOXICITY OF OPEN AIR TO A VARIETY OF MICROOGANISMS.

Nature (London), vol. 221:1146-1147, March 22, 1969. 4 refs.
K. R. May, H. A. Druett, and L. P. Packman.
Identifiers: *Toxicity, *Bacteria, Great britain.

The discovery of a factor in the local open air which is toxic to E. coli and which probably arises from forms of atmospheric pollution is described. To simulate aerosols, bacterial particles were held on microthreads, while the loss of viability with time was measured during exposure to the nighttime air. Each of the Gram negative bacteria Serratia marcescens, Pasteurella tularensis and Brucella suis, together with the Gram positive Staphylococcus epidermis and a group C streptococcus, gave decay slopes not greatly different from those of E. coli during simultaneous exposures. Results were compared with those obtained from exposure to clean, enclosed, laboratory air of the same temperature and humidity.
APTIC-25698

THE EFFECT OF FLUORINE ON DAIRY CATTLE. V. FLUORINE IN THE URINE AS AN ESTIMATOR OF FLUORINE INTAKE.

Am. J. Vet. Res., 24 (99):300-306, March 1963. 10 refs.
James L. Shupe, Lorin E. Harris, Delbert A. Greenwood, John E. Butcher, and Harold M. Nielsen.
Identifiers: *Urinalysis, *Ingestion, *Fluorine compounds, Cattle, Fluorosis.

An investigation to determine if the amount of fluorine in the urine could be used as an indicator of the amount of fluorine ingested in the dry matter is described. Thirty-two Holstein-Friesian cows were fed four levels of fluorine, two levels of calcium-phosphorus mineral, and two levels of concentrate mix from about 3 months to 7.5 years of age. Two digestion and balance trials were conducted before calving and three after the animals started to lactate. In addition, after the cows were on trial for 7 years and 52 days, urine was collected approximately every 1.5 hours and composited for each 3-hour interval over a 24-hour period. Urine samples should be taken in the morning for best results; when possible, samples of urine should be obtained from several cows and the results pooled to give a reliable index of the fluorine consumed. The determination of the fluorine-creatinine ratio has merit as a means of adjusting for differences in urine volumes. A correlation exists among concentration of fluorine in the urine, amount of fluorine in dry matter consumed, and length of time that fluorine is ingested. By determining parts per million of fluorine in the

urine and combining this with a knowledge of the length of time the animals had ingested fluorine, the ppm of fluorine in the ingested dry matter could be estimated. Taken alone, however, this measurement was an adequate criterion for a definite diagnosis of fluorosis in cattle. (Author summary modified)
APTIC-25735

DAMAGE CAUSED DUE TO FOUNDRY SMOKE.

Allg. Forst Jagdz., no. 67:220, June 12, 1891.
Translated from German. Belov and Associates,
Denver, Colo., 12p., Oct. 30, 1970.
Personal Author Not Recorded.
Identifiers: *Plant damage, *Hydrofluoric acid, Trees, Discoloration, Germany, Chemical processing, Condensation (atmospheric), Sulfuric acid, Fluorides, Calcium compounds, Phosphorus compounds, Vapors.

A strong red discoloration of pine trees and damage to other trees were observed in the vicinity of a factory located by the Rhine River which processes phosphorites. The Belgian phosphorites used by the factory in question contained 5.25% calcium fluoride; in the reaction with concentrated sulfuric acid, there was consequently a capacity to generate 2.7% hydrofluoric acid. Hydrofluoric acid vapors are exceedingly soluble in water and upon contact with moist objects they were completely trapped. Leaf damage occurred when sulfuric acid was experimentally poured over two grams of calcium fluoride and the vapors generated were fumigated over a plant. Further observations indicated that a very rapid condensation of the acid vapors occurs in the presence of a moist atmosphere. The presence of fluorine was determined in almost all lead samples from the area in the vicinity of the factory.
APTIC-25750

AIR POLLUTION AND SOUTHERN FORESTS.

Forest Farmer, 29 (10):6-7, 18, Oct. 1970.
Donald D. Davis.
Identifiers: *Trees, *Plant damage, *Sulfur dioxide, *Ozone, *Fluorides, Acute, Chronic, Forests, Automotive emissions, Industrial emission sources, Thunderstorms, Topographic interactions.

The most common pollutants capable of causing injury to forest trees include sulfur dioxide, fluoride compounds, and oxidants such as ozone. A major source of SO2 is the burning of coal, petroleum, or gas; petroleum refining, smelting and refining of ores, and the utilization or manufacturing of sulfur containing compounds may also produce SO2. Common sources of fluorides include petroleum refineries, aluminum reduction smelters, and steel manufacturing plants. In the South, a major source is phosphate fertilizer plants. Concentrations of ozone high enough to cause plant injury may result from thunderstorm turbulence which brings oxidants down from the upper stratosphere. Compounds emitted from automobiles and industries react chemically in the air under the influence of sunlight, yielding large quantities of oxidants. Topographic features, such as the large mountain ridges typical of areas of Kentucky, North Carolina, Tennessee, and Virginia, help in trapping these pollutants. Acute injury to conifer needles is usually seen as death and browning of the needle tips or the entire needle, while chronic injury is often seen as a yellowing, dwarfing, and premature shedding of the needles. Chronic O3 injury often causes a mottled appearance to the needle. Some differences among SO2, hydrogen fluoride, and O3 injury to broadleaved plants are cited. Such factors as leaf age, environmental conditions, length of exposure time, herbicides, insects, and fertilizers also may influence symptom development. It is likely, too, that air pollution is responsible for secondary effects, such as predisposing trees to attack by those insects or fungi which are more aggressive on weakened trees.
APTIC-25769

HYDROCHLORIC ACID. BROMINE. IODINE. HYDROGENCYANIDE. ETHYLENE. CARBON-MONOXIDE. MERCAPTANS. COAL GAS. ASPHALT- AND TAR-VAPORS. SATURATED HYDROCARBONS. ACETIC ACID. 2,4-DICHLORO-PHENOXY-ACETIC ACID. MERCURY. SELENIUM. SMOKE AND FOG.

In: Phylotescische Immissionen. Berlin, Parey,
1963. p. 51-71. Translated from German. 35p.
H. Berg.
Identifiers: *Plant damage, Diagnosis, Toxic tolerances, Asphalt, Germany, Tar, Coal tars, Smokes, Fog, Hydrochloric acid, Sulfuric acid, Acetic acid, Hydrocyanic acid, Bromine compounds, Cyanides, Bromine, Iodine, Hydrocarbons, Ethylene, Hydroxides, Iodine compounds, Mercury compounds, Mercaptans, Carbon monoxide, Selenium compounds, Vapors.

Occurrence of the contaminant, its macroscopic and microscopic damage to plant organs, its mode of action, and its diagnosis are summarized, along with differences in resistance among plants for the following: hydrochloric acid, bromine, iodine, hydrogen cyanide, ethylene, carbon monoxide, mercaptans, coal gas, asphalt and tar vapors, saturated hydrocarbons, acetic acid, 2,4-dichlorophenoxy-acetic acid, mercury, selenium, smoke and fog, and sulfuric acid.
APTIC-25826

WHAT AIR POLLUTION DOES TO YOUR PLANTS.

Crop Soils Mag., 24 (3): 14-17, Jan. 1971.
Einar W. Palm.
Identifiers: *Plant damage, Economic losses, Plant indicators, Toxic tolerances, Stack gases, Particulates, Smog, Chlorides, Fluorides, Hydrochloric acid, Hydrofluoric acid, Ethylene, Peroxyacetyl nitrate, Nitrogen dioxide (no2), Sulfur dioxide, Ozone.

Air pollution causes an estimated $500 million in plant losses each year. The invisible chemicals, such as sulfur dioxide, hydrogen fluoride, ozone, nitrogen dioxide, ethylene, and peroxyacetyl nitrates in smog are much more injurious to plants than the black emission from smokestacks, diesel trucks and buses. Plants injured by air pollution will be more susceptible to parasitic diseases, while diagnosis is often complicated because two or more chemicals may work together to increase the injury. Some pollutants, such as ozone, will react differently on different species or even varieties of the same plant species. Sulfur dioxide, produced in the smoke stacks of industrial plants, can be a double threat. The chemical itself is damaging to plants, and it may also combine with moisture to form droplets of sulfuric acid which can injure plant tissues. Certain indicator plants can be used to help determine what pollutants are the cause of plant injury. Finding a plant variety or substitute crop that is less susceptible to foul air is one step that can be taken, or high-value crops might be sprayed with pollution-reducing materials such as ozoban and ascorbic acid. Plant breeding in the future will be directed toward the identification, selection, and production of plants which can actually filter pollutants out of the air. However, government, industry, and our universities must work together to reduce the toxic materials in our air. Sources, plant response, and symptoms are presented tabularly for sulfur dioxide, hydrogen fluoride, hydrogen chloride, nitrogen dioxide, ozone, peroxyacetyl nitrate, ethylene, and particulate matter.
APTIC-25865

THE CURRENT LEAD CONTENT IN VEGETATION GROWING IN THE VICINITY OF SWISS HIGHWAYS.

(Der jetzige Bleigehalt der Vegetation in der
Naehe schweizerischer Autostrassen). Text in
German. Z. Praeventivmed., vol. 15:235-243, 1970.
12 refs.
Th. Keller.
Identifiers: *Plants (botany), *Highways, *Absorption, *Lead compounds, Seasonal, Crops, Alfalfa, Fruits, Trees, Vegetables, Europe, Engine exhausts, Internal combustion engines, Automobiles, Tetraethyl lead.

The factors affecting the level of lead accumulated in cultures growing near highways travelled by automobiles are traffic density, season, the age of pine needles, the surface structure of the exposed plant organs, and the vertical and horizontal distance from the highway. In contrast, the lead content in the soil is hardly a factor, partly because only a small fraction of the lead compounds in the soil are absorbed by plant roots and partly because transport of lead within the plant is minimal. A large percentage of lead found in plants adheres to the surface, but this lead washes off only to a limited extent. The lead concentration of unwashed crops at a distance of 100 m from highways with heavy traffic was considerable; hay contained 2-8 ppm; leaf vegetables, 3-7 ppm; carrots, 2-3 ppm; fruit, 0.7 to 2.7 ppm; and cereals, 0.3-0.5 ppm. Conifers are an excellent air filter, and highways should be lined on both sides with a strip of evergreen trees and shrubs. Tetraethyl lead as an additive to gasoline should be replaced by safe substitutes, even though hitherto no actual harm has been caused to either plants, animals, or humans from lead emission from highway traffic.
APTIC-25878

SENSITIVITY OF GRAPEVINES TO INJURY BY ATMOSPHERIC SULFUR DIOXIDE.

(Taikichu no SO2 ni taisuru budo no shogai
kanjusei ni tsuite). Text in Japanese. Engei Gakkai
Zasshi (Tokyo), 39 (3):13-17, Sept. 1970. 8 refs.
Takashi Fujiwara.
Identifiers: *Grapes, *Plant damage, *Sulfur dioxide, Seasonal, Plant growth, Toxic tolerances, Japan, Greenhouses.

Sensitivity of grapevines to injury by sulfur dioxide was studied. One and two-year-old plants were exposed to different concentrations of the gas (0.26, 0.13, 0.065, and 0 ppm) at different seasons in a greenhouse. Sulfur dioxide caused lesions on the leaves, and the lesions were especially severe in the lowest leaves. Leaf lesion and early leaf fall increased in proportion to the gas concentrations. Six varieties of grapevine used varied considerably in their sensitivity to the gas. Fredonia variety was highly sensitive and Delaware grape was fairly sensitive. Kyoho and Neomuscats were intermediate, and Kyogei grape was resistant. Koshu was the most resistant. Sensitivity of Fredonia grape varied with season (state) and increased from spring to autumn. Fredonia and Delaware grapes were exposed to gas from May to October 1967 to clarify the effect of exposure from the preceding year on shoot growth and cluster formation. The degree of leaf lesion of Fredonia grape became more remarkable in proportion to the gas concentrations and the extent of the exposure period. Also, leaf lesion of Delaware grape was abundant at the concentration of 0.26 ppm after extension of the exposure duration. After terminating the gas exposure, new shoot growth and cluster formation of Fredonia grape decreased in 1968 with the increasing gas concentrations, corresponding to the degree of leaf lesion and falling in 1967. Shoot growth of Delaware grape decreased at 0.26 ppm and cluster formation also decreased at 0.13 ppm.
APTIC-25888

DOSING OF SMALL AMOUNTS OF DUST BY MEANS OF A DOSATOR WITH A GRANULAR BASE.

(Dozirovaniye malykh kolichestv pyli s
pomoschch'yu dosator s zernistym nositelem).
Text in Russian. Gigiena i Sanit., no. 7:87-89, 1970.
5 refs.
F. Strenk, A. Haba, and A. Rohovetsky.
Identifiers: *Dusts, *Aerosol generators, *Exposure chambers, Cements, Asbestos, Europe.

An abrasion-resistant granular material (plastic) is used to carry test dust into a fluidized bed from

which the dust is then carried by Bernoulli effect into an animal test chamber. Tests with cement, talc, and asbestos gave delivery rates stable within plus or minus 4%.
APTIC-25906

THE STUDY OF DAMAGES CAUSED BY AIR POLLUTION TO LIVE PLANTS AND PLANT COMMUNITIES.

(Das Studium der Schaden an Wildpflanzen und
Pflanzengesellschaften verursacht durch
Luftverunreinigung). Air Pollution Proc. First
European Congr. Influence Air Pollution Plants
Animals, Wageningen, Netherlands, 1968, p. 183-
192. Translated from German. Belov and
Associates, Denver, Colo., 13p., Nov. 4, 1970.
J. Hajduk, and M. Ruzicka.
Identifiers: *Plant damage, Research programs, Plant indicators, Czechoslovakia, Magnesium compounds, Mercury compounds, Sulfur dioxide.

A review of the literature is provided concerning the influence of air pollution on wild plants and vegetation. Such studies are recommended in order to predict the influence of toxic emissions of new industries upon the landscape. Examination of individual species is also essential to determine their resistance and whether or not they are indicators of pollution. Studies were made in the Institute for Landscape Biology in Bratislava of the effects magnesium oxide, sulfur dioxide, mercury, and other toxic materials have upon vegetation. The directions which research should take with regard to protecting the landscape are indicated.
APTIC-25927

INORGANIC FLUORIDES.

For primary bibliographic entry see Field 11.
APTIC-25933

THE CHEMISTRY, HISTOLOGY, AND ROENTGENOLOGY OF THE TEETH AND BONES OF LARGE ANIMALS.

A.M.A. Arch. Ind. Health, 21 (4):346-347, April
1960.
J. Le Grande Shupe.
Identifiers: *Diagnosis, *Bones, *Fluorosis, *Teeth, Cattle, Sheep, Pathological techniques, Radiography.

When more than 50,000 cattle and sheep were classified according to effects of fluroide, it became evident that molar teeth were of importance in evaluating fluorosis, but the examination of the area was difficult. It was important not to confuse a black discoloration with the stain due to fluoride, which cannot be scraped from the surface of the teeth. Some areas of compact bone showed increased numbers and closer concentration of haversian canals, suggestive of new bone formation and bone reconstruction. Definite microscopic abnormalities were observed only in those bones that contained as much as, or more than, 4000 parts of fluoride per million. Abnormalities were characterized roentgenologically by an increased density or apparent abnormal porosity of bone, periosteal feathering and thickening, increased trabeculation, thickening of the compact bone and narrowing of the marrow cavity.
APTIC-25945

THE PROBLEM OF CEMENT FACTORY DUST FROM THE AGRICULTURAL STANDPOINT.

Contemp. Agr. (English translation from Serbo-
Croatian of: Savremena Poljoprivreda), 17 (7-
8):87-96, 1969. 26 refs. NTIS: TT 69-51001/7-8
K. Holobrady, and J. Toth.
Identifiers: *Photosynthesis, *Cements, *Dusts, Carbon black, Czechoslovakia, Fertilizer manufacturing, Mineral processing, Build-up rates, Sampling methods, By-product recovery, Boron compounds, Calcium compounds, Copper compounds, Magnesium compounds, Manganese compounds, Molybdenum compounds, Potassium compounds, Sodium compounds, Zinc compounds, Oxides, Silicon dioxide, Ph.

The greatest sources of dust pollution in Czechoslovakia are cement factories with rotary furnaces, discharging almost 100,000 tons of dust into the air annually. Dust discharge have an undesirable effect on the thermal balance of furnaces and, moreover, lower the production of clinker. If escaping dust can be trapped, there is the possibility of using it as fertilizer, because of its lime and potassium content. Samples of solid aerosols were obtained by means of passive sedimentation at sites distributed over areas subject to the influence of airborne particles from cement factories. Chemical tests were made using silicate analysis methods and spectrography. The pH factor was measured, and the rate of accumulation of organic carbon was determined. From the agricultural viewpoint, the following compounds obtained from passive sedimentation are of interest: calcium oxide, magnesium oxide, potassium monoxide, sodium monoxide, silicon dioxide, and the trace elements copper, boron, zinc, manganese, and molybdenum. The depression in the accumulation rate of organic carbon after the formation of an even layer of dust demonstrates that solid aerosol particles affect photosynthesis. On an electron microscope photograph, chloroplasts of dust-contaminated leaves have a blurred outline and the tilacoids are difficult to discern. While the action of dust pollution on sugar beet did not affect the yield, it did influence the quality of the beet.
APTIC-25964

OCCURRENCE OF AIRBORNE LEAD IN SAN FRANCISCO BAY AND ITS RELATION TO ANIMAL DISEASE.

In: Project Clean Air. California Univ., Berkeley,
School of Public Health, California Univ. Res.
Proj. S-19, 11p., Sept. 1, 1970. 9 refs.
R. C. Cooper.
Identifiers: *Fish, *Harbors, *Lead compounds, Animals, San francisco, Soils, Analytical methods, Neutron activation analysis, Spectrophotometry.

Fish and samples of bottom sediments were collected from San Francisco Bay and analyzed for lead by neutron activation analysis, proton activation analysis, and the dithizone 'wet chemical' method. Neutron activation analysis was a failure because of the high energy produced by sodium present in test samples. In addition, the dithizone method and proton activation yielded very real differences in values. Based on the dithizone results, lead levels in fish are relatively great: they range from 0.14 ppm in Sculpin to 6.37 ppm in shrimp. The amount of lead in Bay sediments ranged from 10.9 ppm near the shore to 7.80 ppm approximately 0.9 miles offshore. These values are not exceptionally high when compared to the 16 ppm average lead content in the earth's crust. No correlation between fish disease and lead content could be determined.
APTIC-25967

THE INFLUENCE OF AIR POLLUTION. 3.1. THE INFLUENCE OF AIR POLLUTION ON TREES. 2. THE CHARACTERISTICS OF INSOLUBLE SUBSTANCES ADHERRED TO THE LEAVES OF ROADSIDE TREES.

(Jumoku ni taisuru taikiosen no eikyo. Dai 2 ho.
Gairoju no yomen no fuchaku shita fuyokaisei
busshitsu no seijyo). Text in Japanese. Kanagawa-
Ken Taiki Osen Chosa Kenkyu Hokoku (Tech.
Rept. Air Pollution Yokohama-Kawasaki Ind.
Area), no. 11:94-99, Feb. 1969.
Personal Author Not Recorded.
Identifiers: *Leaves, *Non-urban areas, *Urban areas, *Pollutants, Seasonal, Trees, Radiogrpahy, Quartz, Japan, Industrial areas, Dusts, Soot, Chemical composition, Dust fall, Soot fall, Magnesium compounds, Silicon dioxide, Sulfur oxides, Diffraction.

Studies were performed on insoluble substances adhering to the leaves of roadside trees with respect to regional and seasonal distribution and alteration, relationship of falling soot and dust amounts, chemical constituents, x-ray diffration flexibility, and evaporative amounts of leaves at nine places of Yokohama, Kawasaki and Hiratsuka. In addition, the relationship of the insoluble substance to the concentration of air pollution was studied. The industrial areas had a difference of 4.2 to 6.5 times in g/sq m of insoluble substance in comparison with non-industrial areas and the amounts increased from spring to mid-summer. The correlation coefficient between insoluble constitutents in the falling soot and dust, total amounts of falling soot and dust, sulfur oxides, and insoluble substances adhering to the leaves was 0.602, 0.477 and 0.802; the contaminating influence by sulfur oxides was the highest. As the result of analysis by alkali dissolving method, silicon dioxide was the highest with a little magnesium oxide. There were many peaks in x-ray diffraction due to quartz and feldspar which contained mainly silicates. The peaks were more numerous in the falling soot and dust in the industrial area, and this fact presented their compound constituents. The evaporative amounts of leaves per unit increased in places where adherent amounts were more in the industrial area; there was no difference between other industrial places and non-industrial areas.
APTIC-26035

MAN AND AIR -- THREATS TO PRAIRIE SURVIVAL.

Lasca Leaves, 20 (4):78-81, 92, Dec. 1970. 6 refs.
(Presented at the Prairie Conference, 2nd
Midwest, Madison, Sept. 20, 1970.)
George P. Hanson.
Identifiers: *Plant damage, Necrosis, Plant growth, Genetics, Toxic tolerances, Highways, Humidity, Hydrofluoric acid, Fluorides, Ethylene, Lead compounds, Peroxyacetyl nitrate, Nitrogen dioxide (no2), Sulfur dioxide, Ozone, Silicon compounds, Reaction mechanisms.

Most pollutants enter the leaf through tiny pores in the leaf surfaces and cause internal leaf damage. These tiny pores or stomates are the passages through which gas exchanges take place during photosynthesis and respiration. At a given pollutant level, other things being equal, a plant growing under conditions of high humidity will take in more pollutant and become more severely damaged than a plant growing under arid conditions. Once the pollutants have entered the leaf, each has its own characteristic type of interaction with the plant tissues. Small animals living along a busy highway could accumulate lead by consuming lead-containing herbage or breathing lead laden air. Fluoride air pollutants damaging to plants are hydrogen fluoride and silicon tetrafluoride. The characteristic symptom of fluoride damage is necrosis on leaf tips and margins where the fluoride has been concentrated. Ethylene causes a general reduction in growth, decreases apical dominance, and stimulates lateral development. Ozone enters through the stomates and attacks the palisade tissue, while sulfur dioxide enters the leaf through the stomates and reacts with water on the moist cell surfaces to form sulfite which is in turn slowly oxidized to sulfate. Peroxyacetyl nitrate enters the leaf through the stomates where it attacks the cells of the spongy mesophyll, and nitrogen dioxide causes growth reduction and defoliation at concentrations often present in polluted areas. Air pollution is having a detrimental economic effect on agriculture in the nation, while also altering the ecological relationships of plants and animals. Fortunately, most species have a great wealth of genetic variation in sensitivity to air pollution. The mechanism of plant tolerance to air pollutants is mentioned.
APTIC-26055

EFFECT OF AIR POLLUTION ON TREES. 3. ANALYSIS AND FRACTIONATION OF SULFUR IN THE LEAVES OF STREET TREES.

(Jumoku ni taisuru taikiosen no eikyo. Dai 3 po.
Gairo juyo no io ganryo to sono bunbetsu). Text in
Japanese. Kanagawa-Ken Taiki Osen Chosa
Kenkyu Hokoku (Tech. Rept. Air Pollution

Yokohama-Kawasaki Ind. Area), no. 11:100-113, Feb. 1969.
Personal Author Not Recorded.
Identifiers: *Leaves, *Sulfur trioxide, Trees, Japan, Industrial areas, Sulfuric acid.

In order to determine the correlation between air pollution and withering of trees, sulfur compounds were fractionated from the surface of leaves or from themselves in 59 districts in Yokohama City and Kawasaki City, and their content was estimated. From the standpoint of regional groups, both sulfuric acid calculated as sulfur trioxide on the surface and in the leaves and the ratio of it to total sulfuric acid were significantly higher in the industrial areas; sulfuric acid in the leaves was somewhat higher in those areas. In industrial areas, the content of sulfuric acid was high in plane trees and sultan's parasol; in non-industrial areas, it was high in willow trees. The correlation coefficient between the content of sulfuric acid and the amount of sulfur compounds in the air was 0.771 for sulfuric acid in the leaves and 0.597 for total sulfuric acid. From analysis of sulfur compounds in water-soluble fraction (A) which was absorbed on the surface of leaves, water soluble fraction (B) which was extracted by heated water, acetate-soluble fraction and insoluble fraction of street trees, it was clarified that sulfuric acid was high in the water soluble fraction (A) and in the total sulfuric acid fraction of the trees which were planted in the industrial areas, although there was somewhat a difference among the groups of trees. Sulfuric acid in the water soluble fraction (B) showed no difference among regional groups. Sulfuric acid in the acetate-soluble fraction was low.
APTIC-26078

INVESTIGATION ON INJURY TO PLANTS FROM AIR POLLUTION IN THE LOS ANGELES AREA.

Plant Physiol., vol. 27:18-34, 1952. 12 refs.
A. J. Haagen-Smit, Ellis F. Darley, Milton Zaitlin, Herbert Hull, and Wilfred Noble.
Identifiers: *Plant damage, *Plant indicators, *Smog, Alfalfa, Oats, Spinach, Heptenes, Hexenes, Nitrogen dioxide (no2), Peroxides, Ozone, Reaction mechanisms.

Spinach, beet, endive, oat, and alfalfa plants were used for the determination of crop damaging pollutants in the air of metropolitan Los Angeles. The air pollution, or smog, symptoms on these indicator plants are well known. The production of a metallic glaze or silvering on the lower surface of leaves on spinach, beet and endive especially distinguishes this damage from the effect of previously known toxic materials. Activated carbon filters were devised which removed the toxic agents from the polluted air. The filters demonstrated that sublethal concentrations of smog had a depression effect on the growth of the plants. Principal attention was given to the reaction products which are formed in the air from natural components and air pollutants, as well as from the air pollutants with each other, after earlier tests with a series of pure compounds of organic nature failed to produce smog symptoms. The reaction products of ozone with unsaturated hydrocarbons produced typical smog damage on all of the indicator plants. The damaging factor must therefore be attributed to the peroxides formed in the ozonization process. Optimum effects were obtained by using olefins with five and six carbon atoms with the double bond in the end position. However, the end position of the double bond is not essential, since 3-n-heptene, 4-n-nonene and cyclo-hexene gave typical smog damage upon ozonization. The concentration of ozone at which damage occurs with the olefins is well within the range of ozone concentration found in the atmosphere as determined by the rubber cracking test. The optimum activity of the C5 and C6 series is attributed to the stability of the intermediate products in the reaction process. The catalytic oxidation of the olefins with nitrogen dioxide under the influence of sunlight produces oxidation products very similar to those produced by ozone. In the plant fumigations with oxidation products of olefins, lachrymatory effects were often observed. These investigations demonstrate the utility of plants in analyzing air pollutants. They further show for the first time that hydrocarbons, normally harmless air pollutants of organic nature, can cause severe damage through their reaction with substances known to be in the air. (Author summary modified)
APTIC-26146

EFFECTS OF AIR POLLUTANTS ON AGRICULTURE AND FORESTRY: PLANTS.

In: Project Clean Air. California Univ., Berkeley, Task Force No. 5, Section 2, 23p., Sept. 1, 1970. 174 refs.
Victor P. Osterli.
Identifiers: *Plant damage, Economic losses, Plant growth, Plant indicators, Synergism, Forests, Oxidants, Particulates, Smog, Fluorides, Ethylene, Nitrogen oxides, Sulfur dioxide.

The effects of air pollutants on plants are usually noted on the leaves because they are the site of gas exchange and photosynthesis. Pollutants often produce characteristic markings on a given plant species, providing a means of pollutant identification. Severity of injury varies with pollutant, concentration, duration of exposure, and plant species. Specific effects are cited for sulfur dioxide, fluorides, photochemical oxidants, oxides of nitrogen, ethylene, pollutant combinations, and particulates. A recent estimate of air pollution damage to California crops is reported at $44.5 million annually. Increased attention must be given to the following research needs: improved accuracy in the assessment of economic losses to agriculture and forestry resulting from air pollution; the growth depression effect on plants due to long-term low-level exposure to ethylene, sulfur dioxide, fluoride, and oxides of nitrogen; the synergistic effect of combined sub-lethal concentrations of air pollutants on plants; the effects of air pollutants on biochemistry, metabolism, and anatomy of plants; the relative sensitivity of the various needle-leaf species; the quality of the forest air environment; the impact of long-term oxidant exposure on growth; and more accurate methods for determining the extent and severity of smog damage.
APTIC-26158

IMPLICATIONS OF AIR POLLUTION FOR PLANT LIFE.

Proc. Am. Phil. Soc., 114 (1):18-21, Feb. 16, 1970. 17 refs. (Presented at the Symposium on Atmospheric Pollution: Its Long-Term Implications, April 25, 1969.)
Leonard H. Weinstein, and Delbert C. McCune.
Identifiers: *Plant damage.

The major implication of air pollution for plants is that its control may be as complex as its origins and effects. Two basic approaches can be taken. First, access of the pollutants to plants may be restricted by chemical protection, removal of pollution sources from the plant environment, or controlling pollution at its source. In each of these options, a balance will have to be found between cost and benefit. A second approach to control the effect of air pollution on plants requires a program to develop or select plants that will prove more resistant, or cultural practices that will modify the response of plants to pollutants. These objectives require research, which in turn requires time, but they could result in immediate reductions in crop losses as control methods are developed and introduced.
APTIC-26219

BIOGEOCHEMICAL IMPLICATIONS OF LEAD IN THE HYDROSPHERE.

In: Project Clean Air. Scripps Institution of Oceanography, La Jolla, Calif., California Univ. Task Force Assessments, Vol. 2, App.-F, 23p., 1970. 43 refs.
Tsaihwa J. Chow.
Identifiers: *Thresholds, *Hydrosphere, *Tetraethyl lead, *Isotopes, Acute, Chronic, Animals, Humans, Toxicity, Toxic tolerances, Metal poisoning, Lakes, Oceans, Rivers, Engine exhausts, Aerosols, Control methods.

Present knowledge of the occurrence and toxicity to living organisms of lead in fresh and saline waters is reviewed. Lead pollution of the hydrosphere originates overwhelmingly from the burning of lead alkyl additives in automotives fuels; the resultant lead aerosols suspended in the atmosphere will eventually enter bodies of water as runoff or precipitation. The use of the characteristic isotopic compositions of various lead ore deposits makes possible the identification of the source of lead pollutants. An historical increase in lead pollution has been found by analysis of precipitated lead in chronological layers of old preserved snow strata. The concentration of lead in sea water is very low and difficult to measure; for fresh water, the global mean lead content appears to lie between 1 and 10 micrograms/l. Lead poisoning in humans is reported from drinking water levels from 42-1000 micrograms/l or more, but is is possible that 100 micrograms may cause chronic poisoning if the water is used continuously. Farm animals are frequent victims of lead poisoning from water. For aquatic communities, lead pollution appears to reduce the number of species and individuals; fish are the most sensitive. Toxic lead need not necessarily be in solution but may be in suspension. Lead is less toxic in hard water streams than in soft waters. Recommendations for lead pollution control are made, and topics for future research suggested.
APTIC-26224

AIR POLLUTION FROM FLUORIDES.

For primary bibliographic entry see Field 01.
APTIC-26258

CONTAMINATION OF DAIRY FEEDS BY AIR POLLUTION.

Milk Food. Technol., 33 (12):553, 561, 567, Dec. 1970.
Samuel B. Guss.
Identifiers: *Cattle, *Ingestion, *Stack gases, *Dusts, Digestion, Metal poisoning, Lead, Limestone, Pennsylvania, Highways, Farms, Engine exhausts, Mineral processing, Primary metallurgical processing, Vehicles, Lead compounds, Ph.

Where industry is encroaching upon land used for production of feed and forage crops, air pollution of forage for dairy cattle is already a serious problem. In Pennsylvania, lead poisoning and serious metabolic disease resulting from lime plant stack effluents have caused losses on dairy and beef cattle farms. Dairy cattle in the vicinity of lime plants have a very high incidence of milk fever, infertility, and bone abnormalities. Brood cows in a purebread beef cattle herd experienced ovarian cysts and osteopetrosis. Lime dust also affects the pH of the digestive tract to a great extent limiting digestion and absorption of some components of the diet. In two farms in Berks County, pastures close to lead smelters contained enough lead dust contamination on grass to kill cows. Effluents must be constantly monitored and the attitudes of the offenders must be changed by stiff penalties. Deposition of lead from gasoline exhaust may be an important factor influencing the health of animals living on farms along heavily traveled highways. Molybdenum and fluorine also have been involved in problems which have caused severe losses in a few cattle herds. (Author abstract modified)
APTIC-26276

9. EFFECTS - MATERIALS

OXIDES OF NITROGEN AS A FACTOR IN COLOR CHANGES OF USED AND LAUNDERED COTTON ARTICLES.

Am. Dyestuff Reptr., vol. 54:305-311, April 26, 1965. 32 refs.
Verda McLendon, and Florence Richardson.
Identifiers: *Discoloration, *Cottons, *Nitrogen oxides, Laundries.

Nitrogen oxides were found in drums of gas-fired household dryers in concentrations sufficiently high to produce color changes in certain dyed cottons as well as to yellow white cottons that were repeatedly dried. The same color changes were obtained at a more rapid rate when samples from dyed fabrics and laundered white cottons that had been dried on indoor racks were exposed to high concentrations of nitrogen oxides produced in the laboratory. The color changes in the dyed cottons may be the results of a reaction with nitrogen oxides similar to the well-known reaction between these oxides and the anthraquinone acetate dyes. Noncellulose substances on white cotton fabrics that react with nitrogen oxides to cause yellowing were tentatively identified as nitrogenous compounds from perspiration and certain fluorescent whiteners used in detergents. In the case of whiteners, the apparent yellowing was due to a decrease in fluorencence and would therefore be visible only when the articles containing them are observed in sunlight or other light containing ultraviolet radiation. Removal of nitrogenous compounds was difficult; of the methods tested, only sodium hyperchlorite solution containing 0.2% available chlorine consistently removed most of the nitrogen from the fabrics. This bleach concentration is higher than that recommended for home laundering, since it would likely cause excessive fabric damage. However, fabrics were satisfactorily whitened by milder oxidizing conditions which did not completely remove the nitrogenous compounds. (Author summary modified)
APTIC-24608

ATMOSPHERIC CORROSION OF TALLIUM.

(Atmosfernaya korroziya talliya). Text in Russian. Zashch. Metal., 6 (4):444-447, 1970. 10 refs.
B. N. Rybakov, G. V. Maslova, and D. I. Zalkind.
Identifiers: *Thallium, *Corrosion, *Sulfur dioxide, *Hydrogen sulfide, Ussr, Humidity, Metal compounds, Reaction kinetics, Temperature.

Studies of atmospheric corrosion of thallium at 20 C with a relative humidity of 74% revealed that the presence of 0.01 mg/l of sulfur dioxide or hydrogen sulfide first increased the rate of corrosion; after about 15 days, corrosion decreased, reaching a level far below that reached in the absence of these gases. The rate of corrosion increased both with temperature (20-45 C) and relative humidity (40-95%), while the Tl (+)/Tl (3+) ratio was (2-3)-fold higher at 30 C as compared to 45 C for relative humidity ranging 74-95%.
APTIC-24619

PROPERTIES OF ELECTROLYTE FILMS IN ATMOSPHERIC CORROSION.

(Eigenschaften von Elektrolyt-Filmen bei der atmosphaerischen Korrosion). Text in German. Werkstoffe Korrosion, 21 (1):16-21, Jan. 1970. 11 refs.
D. Knotkova-Cermakova, and J. Vlckova.
Identifiers: *Corrosion, *Sulfur dioxide, Metals, Copper, Iron, Czechoslovakia, Combustion products, Condensation (atmospheric), Precipitation, Sulfates, Chemical reactions, Oxidation, Condensation, Electrolysis, Dispersions, Liquids, Ph, Surface properties.

The composition of dew-induced films on pure metals and on metals already covered with layers of corrosion products was studied. The composition of electrolyte films forming on metal surface depends on the composition and concentration of atmospheric pollutants and on the nature of the corroded metal. The mineralization of electrolyte films is caused by mineral components of atmospheric precipitations, by soluble salts of solid pollutants which settle on metal surfaces, by agressive gases in the atmosphere, especially by sulfur dioxide and by the dissolution of parts of already existing corrosion products. Sulfur dioxide is absorbed by water and by aqueous solutions very fast with an equilibrium attained within 2 to 4 hours. An electrolyte of pH 4 was produced by a 1 ppm SO2 pollution of the atmosphere which was promptly converted to SO4-ions; only traces of SO2 remained. The increase of the sulfate ion concentration with increasing partial pressure of SO2 was not linear. Water-soluble salts of existing corrosion products had a definite influence on the oxidation of the absorbed SO2. On iron surfaces, a pH of between 5.5 and 5.9 was reached after 6 hours, no matter what the SO2 concentration in the atmosphere (within limits of from 1 to 55 ppm SO2). Copper behaved similarly. Electrolyte films are of two categories: films formed in the initial stage of atmospheric corrosion in a stationary manner, and very thin films forming on metal surfaces without dew, condensation or atmospheric precipitation. The films of the first category have a definite thickness of the order of tens of micromilimeters and exceptionally of hundreds of micromilimeters.
APTIC-24655

WATER PERMEABILITY OF RUST LAYER FORMED BY ATMOSPHERIC CORROSION.

(Taiki fushoku de shojita sabiso no tosuisei). Text in Japanese. Tetsu To Hagane, 56 (13):1781-1785, Nov. 1, 1970. 6 refs.
Jiro Satake, and Taishi Moroishi.
Identifiers: *Corrosion, *Steel, *Permeability, Japan, Water, Reaction kinetics.

Water permeability of rust layers formed on a carbon steel and a low alloy steel by atmospheric corrosion was evaluated by impedance measurement of the rusted specimen electrode in aqueous 0.1 M sodium benzoate solution. Resistance of the rust layer decreased with immersion time as the solution penetrated into the rust and finally attained a steady state. Initial and final values of the resistance, and also the time necessary to react the steady state, increased with increasing periods of atmospheric exposure. Values for the same exposure time were larger for the low alloy steel than for the carbon steel. A linear relationship exists between atmospheric corrosion rates and reciprocals of the final resistances which provide a measure for the porosity of the rust layer. In the case of low alloy steel, a deviation of the final values from the linearity is found, but the initial values come to agree with the line as exposure time increases. It is assumed that the corrosion rate depends on the degree of wetness, which in turn determines the size of the area on the surface of the steel that will be penetrated by water.
APTIC-24671

REACTION OF SO2 WITH POLYMER.

J. Appl. Polymer Sci., vol. 13: 2504-2505, 1969. 2 refs.
H. H. G. Jellinek, and F. J. Kryman.
Identifiers: *Materials deterioration, *Plastics, *Sulfur dioxide, Synthetic rubber, Oxygen, Ultraviolet radiation, Pressure, Temperature.

Data are presented for the deterioration of polymers (isotactic polystyrene, isotactic poly (methylmethacrylate, poly-alpha-methylstyrene, polyvinylpyrrolidone, polyvinylformal, and polycarbonate) exposed in a vacuum for 10 hrs at 25 C to sulfur dioxide, near-ultraviolet light (Lambda greater than 2800 A), and oxygen alone or in combination. Isotactic polystyrene and isotactic poly (methyl methacrylate) deteriorated less than the atactic isomers, except when exposed to a combination of UV, O2, and SO2. Poly-alpha-methylstyrene showed a pronounced decrease in intrinsic viscosity when exposed to UV-SO2-O2, and was appreciably more reactive than actactic polystyrene. Polyvinylpyrrolidone was extensively crosslinked while exposed to UV-O2 and less so in the presence of UV-O2-SO2. Polyvinylformal also showed a decrease in intrinsic viscosity when exposed to UV-O2-SO2 and exhibited crosslinking under other conditions, especially when exposed to SO2 in the dark. Polycarbonate showed no effect under all conditions of exposure and only a very slight chain scission when exposed to UV-O2.
APTIC-24742

GAS FADING OF ACETATE AND TRIACETATE PRINTS.

Am. Dyestuff Reptr., 54 (26):27-31, Dec. 20, 1965. 4 refs. (Presented at a Meeting of the Western Section, American Association of Textile Chemists and Colorists, Shelton, Conn., Dec. 11, 1964.)
F. S. Moussalli, and W. J. Myles.
Identifiers: *Gas fading inhibitors, *Fading, *Synthetic fibers, Nitrogen dioxide (no2), Ozone, Gases.

A new inhibitor, Indyeco Compound 7, makes possible a higher level of performance in disperse prints on acetate and triacetate. It offers greatly improved resistance to gas and ozone fading, as well as to chlorinated pool water fading. It is nonflushing, nonyellowing, and fast to home washing and dry cleaning. With its help, a wide range of disperse blue dyes can be used without sacrificing good fabric properties. Compound 7 is easy to apply: it is simply dissolved in phenyl cellosolve and stirred into a print paste. Instructions are included for preparing a typical paste. The economics of the inhibitor are such that above one percent of dye on a fiber, it becomes more economical to use gas sensitive dyes protected by the inhibitor. Below one percent, it is more economical to use gas-fast dyes.
APTIC-24781

OZONE CRACKING OF RUBBERS.

Akron Univ., Ohio, Dept. of Chemistry, Thesis (Ph.D.), Ann Arbor, Mich., Univ. Microfilms, Inc., 1967, 160p. 73 refs.
Hiroshi Hirakawa.
Identifiers: *Cracking, *Rubber, *Ozone, Mathematical analyses, Diffusion, Hydrogenation, Reaction kinetics, Reaction mechanisms, Temperature.

A study was undertaken to more quantitatively establish the behavior of ozone cracking of rubbers with regard to the effect of temperature, critical energy necessary for cut growth, ozone concentration, degree of unsaturation, the presence of swelling agents on the rate of cracking, and applicability to the Williams, Landel and Ferry relationship at low temperature. Butyl rubbers were chosen for low levels of unsaturation with a small change of polyisobutylene structure. Swelling agents, Nujol for butyl rubber and Circosol for butadiene-styrene copolymer, were also chosen to be inert in the ozonized oxygen atmosphere. Agreement of the crack growth rate in butyl rubbers with the appropriate relation for segmental mobility, as in butadiene-styrene copolymers, is striking evidence for the dominant role of segmental mobility in determining the rates of growth of ozone cracks at low temperatures. Diffusion is probably the rate-determining process in butyl rubbers, shown by direct proportionality between the rate of crack growth and the ozone concentration at low temperature. The rate of ozone crack growth of a swollen butadiene-styrene copolymer is also determined by the segmental mobility at low temperature. No reduction in the rate of ozone crack growth takes place at low temperatures by the addition of anti-ozonant (EDTQ). A partial hydrogenation by Ni-catalyst does not occur randomly, but it forms block type of saturated units which are long enough to form an independent network of only saturated chain. This network protects the initiation of ozone cracking. (Author conclusions modified)
APTIC-24799

THERMOCHEMICAL STRENGTH OF GLASS FIBER USED IN BAG FILTERS.

For primary bibliographic entry see Field 02.
APTIC-24878

THE EFFECT OF AIR POLLUTANTS ON COTTON.

Textile Res. J., vol. 34:563-564, June 1964. 3 refs.
Mary Ann Morris, Margaret A. Young, and Tove Aas-Wang Molving.
Identifiers: *Tensile strength, *Materials deterioration, *Cottons.

Shaded and unshaded samples of a combed cotton yarn were exposed to ambient or filtered air for three 28-day periods in Berkeley, California. After each period, the samples were evaluated for reflectance, breaking strength and elongation, and cellulose fluidity. Unshaded samples exposed in unfiltered air had a significantly greater loss in strength than samples exposed in filtered air after 28, 56, and 84 days of exposure. A corresponding difference in strength loss and fluidity of samples exposed in filtered and unfiltered air was not found when samples were shaded during exposure. No appreciable differences were found in the values for elongation or reflectance for samples exposed in filtered and unfiltered air. Although intense smog conditions did not occur during exposure, compounds associated with photochemical smog were present in the atmosphere.
APTIC-24899

EFFECT OF ATMOSPHERIC CONTAMINANTS ON LIGHTFASTNESS TESTING.

Am. Dyestuff Reptr., 47 (1):450-451, June 30, 1958. 9 refs.
V. S. Salvin.
Identifiers: *Light radiation, *Fading, *Textiles, *Pollutants, Combustion products, Nitrogen oxides, Ozone, Surface properties, Acids.

Twenty-eight fabrics were tested in the laboratory for the effects of nitrogen oxides from combustion products, ozone, and acid or alkali surface conditions on lightfastness. To determine if any combination effect of pollutants could be demonstrated, prior exposure to these contaminatnts was combined with subsequent Fade-Ometer tests. The most significant results were shown for direct dyes on cotton. The Direct Red 75 and Direct Blue 76 were changed appreciably in shade by nitrogen oxides. These dyes, and Direct Blue 78, suffered apprecialbe reduction when left acid. The laboratory ozone tests showed instances of slight fading, the ozone-fading effects being more evident in fabrics left acid. In general, no significant changes were observed for dyeings on the nylon and wool fabrics tested. It is concluded that the action of absorbed acid gases, nitrogen oxides, and ozone may contribute to lack of reproducibility of sunlight testing in various geographic locations and seasons of the year.
APTIC-24906

AIR HUMIDITY AND BRUSH CONTACT DROP: THE EFFECT OF WATER VAPOR, SULFUR DIOXIDE, AND HYDROGEN SULFIDE.

Trans. Amer. Inst. Elec. Eng., 73 (15):1383-1389, Dec. 1954. 4 refs. (Presented at the American Institute of Electrical Engineers, Fall General Meeting, Chicago, Ill., Oct. 11-15, 1954, Paper 54-351.)
Howard M. Elsey, Lawrence E. Moberly, and John L. Johnson.
Identifiers: *Materials deterioration, *Operating variables, *Humidity, *Sulfur dioxie, *Hydrogen sulfide, Seasonal, Copper, Potentiometric methods, Recording methods, Sulfur dioxide, Water, Vapors, Surface properties.

Evidence is presented to show that normal variations in the concentrations of water vapor. sulfur dioxide, and hydrogen sulfide, all of which are present in industrial atmospheres, can be important factors in determining the quality of the film which is laid down on copper by a brush. The test apparatus and the working procedure are described. A schematic drawing is included of the air purifying and humidifying train, which also indicates the flow path through the slip-ring chamber; room air is indicated as entering a drying tower which is charged with activated alumina, from which the air is passed through one of two flowmeters to either one of two bubbling towers to be saturated at 32 or 85 F. An increase in absolute humidity from 2 to 13 grains per cubic foot was indicated to be definitely detrimental to the properties of the films which are laid down on copper by seven out of eight electrographitic brushes. Therefore, changes in the water content of summer air must be considered as one of the variable factors which will affect the performance of commutating machines. The introduction of sulfur dioxide for only a few minutes definitely altered the film condition for the worse, as did hydrogen sulfide. (Author summary modified)
APTIC-24943

ADVANCES IN THEORETICAL AND PRACTICAL STUDIES OF GAS FADING.

Am. Dyestuff Reptr., 41 (14):297-304, May 12, 1952. 46 refs.
V. S. Salvin, W. D. Paist, and W. J. Myles.
Identifiers: *Fading, *Synthetic fibers, Cottons, Nitrogen dioxide (no2), Gases, Reaction mechanisms.

The phenomenon of gas fading is described and the mechanism of the reaction is discussed in relation to the nature of the fabric, as well as the use of newer dyes and inhibitors. The gas fading of dyed acetate fabrics is due to nitrogen dioxide, which is absorbed from the atmosphere. This gas is very soluble in cellulose acetate but does not react with the fiber to any extensive degree. Certain other fibers gas-fade like acetate. Data are presented regarding the absorption of nitrogen dioxide by cotton and nylon. The acetyl value of the fiber, as well as its moisture content, has a marked effect on the rate of gas fading. The rate of gas fading can be correlated with dye structure. The nature of the chemical changes in dyestuffs and advances in the synthesis of resistant dye structures are discussed. The type of chemical change is of importance in evaluating the newer dyes in accelerated tests. The application and effectiveness of permanent and fugitive inhibitors is reviewed, and an attempt is made to correlate inhibitor structures and properties. (Author abstract modified)
APTIC-24965

ATMOSPHERIC CORROSION OF ZINC- AND CADMIUM-COATED STEEL AND THE COEFFICIENTS FOR RECALCULATING THE RESULTS OF ACCELERATED CORROSION TESTS INTO DATA FOR SERVICE CONDITIONS.

In: Corrosion of Metals and Alloys, Collection No. 2. N. D. Tomashov and E. N. Mirolyubev (eds.), Izdatel'stvo 'Metallurgiya,' 1965, p. 221-233. 2 refs. Translated from Russian, by Ch. Nisenbaum, Israel Program for Scientification Translations, Jerusalem, 1966.
P. V. Strekalov, and G. K. Berukshtis.
Identifiers: *Corrosion, *Cadmium, *Zinc, *Surface coatings, Steel, Ussr, Exposure chambers, Chlorides, Sulfur compounds, Gases.

The rate of corrosion of zinc and cadmium deposits on steel was studied in field tests in regions of the Soviet Union that differ widely with regard to climate and contamination of air by sulfurous gases and seawater aerosols and also in accelerated corrosion testing chambers simulating, respectively, heat and moisture, sulfurous gases, and sea mist. Corrosion time curves obtained for the field tests show that the corrosion of zinc can be accelerated 10 times and that of cadmium 15 times in the presence of sulfurous gases and chlorides. The rate of corrosion of chromated deposits is equal to that of nonchromated deposits. In all climatic regions the appearance of zinc deposits changed more than that of cadmium deposits. Corrosion time curves for the chamber tests show that zinc deposits corrode two to three times more rapidly than cadmium deposits and nonchromated zinc deposits twice as rapidly as chromated deposits. The rate of corrosion was lowest in the heat and moisture chamber and highest in the sulfurous gas chamber. However, these chambers do not give scientifically-based quantitative data on corrosion resistance of deposits under natural conditions because the coefficients of acceleration obtained in the same chamber are different for different deposits. The sea mist and heat and moisture chambers, but not the sulfurous gas chamber, can be used for characterizing of corrosion damage in an industrial atmosphere. In the sulfurous gas chamber, the concentration exceeds that under service conditions by about 2-4 orders of magnitude.
APTIC-24972

CORROSION BEHAVIOR OF CAST IRON IN RURAL, MARINE AND INDUSTRIAL ATMOSPHERES AND IN SEA WATER.

(Das Korrosionsverhalten von Gusseisen in Land-, See-und Industieluft und in Meerwasser). Text in German. Stahl Eisen, 90 (19):1038-1042, Sept. 17, 1970. 4 refs.
Peter Drodten.
Identifiers: *Corrosion, *Iron, Copper, Graphite, Germany, Non-urban areas, Industrial areas, Oceans, Surface properties.

Five year corrosion tests were carried out with test pieces of cast iron containing lamellar or nodular graphite with and without the addition of 1.5% copper exposed to rural, marine and industrial air and to sea water (under conditions of permanent immersion, of sporadic immersion, and of exposure to spray) at several test sites of the Association of German Ironworks. There was no difference in the degree of corrosion between cast iron with lamellar and nodular graphite exposed to sea water; but exposed to air, cast iron with nodular graphite exhibited somewhat greater resistance to corrosion. This difference was significant only on exposure to industrial atmosphere: gray iron exhibited after 5 years a yearly corrosion depth of 0.043 mm while cast iron with nodular graphite exhibited a corrosion depth of only 0.024 mm. The addition of 1.5% Cu to the test pieces had no significant effect on corrosion velocity except in the case of gray iron exposed to industrial atmosphere where the addition of copper markedly reduced corrosion.
APTIC-25544

CORROSION ASPECTS OF AIR POLLUTION IN THE SAN FRANCISCO BAY AREA--RUBBER PRODUCTS.

Bay Area Air Pollution Control District, San Francisco, Calif., Technical Assistance Branch, 10p., 1965 (*). 22 refs.
H. C. Wohlers.
Identifiers: *Rubber, *Ozone, *Cracking, Synthetic rubber, San francisco, Smog, Control methods, Chemical bonds, Economic losses.

Effects of ozone on the cracking of rubber products are reviewed. Tests have shown that ozone attacks the carbon-carbon bond in the rubber molecule. As the rubber molecule becomes more saturated, as in butyl and silicon rubbers, the effect of ozone is reduced. When the rubber is under tension, ozone breaks the carbon-carbon double bond, leaving its neighbor under additional stress. Thus, by ozone attack, a crack progresses until it becomes visible to the naked eye. The size and number of cracks depend on the amount of tension, the type of rubber, the ozone concentration, the exposure time, temperature, and the rate at which ozone passes over the surface of the rubber product. There are three methods of protection against ozone attack: the use of a product that has a high degree of saturation within the compound molecule; the incorporation of a material in the rubber which will 'bloom' to the

surface and present a barrier to ozone attack; and, external protection by a covering such as paper or an ozone resistance surface treatment. The total cost of ozone cracking for rubber tires amounts to $20,000,000 yearly in the U. S.
APTIC-25585

COMBATTING THE EFFECTS OF SMOG ON WIRE-SPRING RELAYS.

Bell Labs. Record, p. 48-52, Feb. 1966.
H. W. Hermance.
Identifiers: *Cracking, *Copper alloys, *Los angeles, *Nitrates, Metals, Nickel, Zinc, Dusts, Particulate sampling, Filters, Ventilation, Simulation, Humidity, Electrolysis.

Investigations into the cause of stress-corrosion cracking in the nickel brass wire springs in some central telephone office relays in Los Angeles are reported. Analysis of bulk dust filter samples of air from Los Angeles, New York, Philadelphia, Baltimore, and Chicago showed significantly high nitrate concentrations for Los Angeles dust deposits, apparently related to smog-causing factors. In addition, the combination of fine earthly material in the Los Angeles samples, the absence of tarry products, and the high proportion of oxidized, polar compounds in the organic fraction probably makes dust deposits there more reactive to moisture than those of eastern areas. Tests were conducted using a laboratory apparatus to simulate conditions of electrolysis of hygroscopic salts in the dust deposits, using ammonium salts of sulfate, nitrate and chloride. Results showed that, of the major ions available in dust deposits, the nitrate ion is highly active in producing stress-corrosion cracking in nickel brass, depending on relative humidity. Below a critical humidity level, which appears to be between 40 and 50%, the cracking in the Los Angeles environment drops rapidly to a negligible rate. New wire-spring relays are now made with cupro-nickel springs since the nitrate corrosion does not appear in the absence of zinc. Cracking in existing nickel brass relays is now controlled by installation of high efficiency filters in the outside air intakes of ventilation systems, and cooling systems are being redesigned to hold the relative humidity below 50% in the telephone stations.
APTIC-25606

THE EFFECT OF AIR POLLUTANTS ON POLYMERS.

Clarkson Coll. of Tech., Potsdam, N. Y., Grant APO0486, 50p., 1970, 19 refs.
Hans H. G. Jellinek.
Identifiers: *Polymers, *Chain scission, *Nitrogen dioxide (no_2), Materials deterioration, Discoloration, Rubber, Nylon, Chlorides, Fluorides, Butadienes, Ethylene, Styrenes, Sulfur dioxide, Oxygen, Ozone, Ultraviolet radiation, Reaction kinetics, Reaction mechanisms.

The mechanisms of polymer-gas reactions (e.g., nitrogen dioxide, sulfur dioxide and ozone), with respect to chain scission, respectively, in the presence and absence of near ultraviolet radiation and oxygen are discussed. The mechanism for atactic and isotactic polystyrene and butyl rubber was studied in detail. Very small amounts of these gases (1 ppm to 5 ppm) have very little effect on vinyl polymers but discolor polystyrene and liberate some halogens in the case of polyvinly chloride and fluoride. Nylon is quite sensitive to NO_2 in this region of concentrations, so is butyl rubber-elastomer. Polybutadine will crosslink in the presence of NO_2, polyethylene and polypropylene will also suffer some crosslinking. At 20 to 100 times higher concentrations of these gases, the deteriorating effects are quite appreciable. (Author summary)
APTIC-25680

CORROSION PRODUCTS IN VARIOUS ENVIRONMENTS.

(Kakushu kankyoka ni okeru kinzoku no fushokuseiseibutsu). Text in Japanese. Hitachi Hyoron, 52 (11):1028-1032, Nov. 1970. 30 refs.
Masataka Kasai, Kazuo Tanno, Osamu Asai, Yasumasa Furutani, and Natsuki Kawashima.
Identifiers: *Corrosion, *Aluminum, *Copper, *Iron, Steel, Japan, Non-urban areas, Urban areas, Oceans, Thermodynamics, Temperature.

Various corrosion products formed in iron, copper, and aluminum the main materials used to construct various equipment, under various environmental conditions were studied through thermodynamics approaches. Some of the conditions causing the corrosion were artificially produced in the laboratory to reconfirm their validity. Main corrosion products of iron, such as $Fe (OH)_2$ formed in neutral water containing no oxidation agent, $Fe (OH)_3$ formed in water containing very little oxidation agent, and formation of a-, b-, r-FeOOH, were discussed by giving a few actual cases of the corrosion of the iron, including corrosion products obtained from soft steel exposed to the atmospher of a city suburb for 2 years and those from soft steel used for about 30 years in a seaside area. Another actual case study was also presented in which validity of the neutralizing anti-rust coating applied to a high-pressure boiler was analyzed. For corrosion products of copper, copper was left in the atmosphere and immersed in water, using congested city atmosphere and clean-air suburban atmosphere and non-heated and heated water. After having been exposed to the atmosphere for 30 seconds, copper was coated with cuprous oxide about 70-90 A thick. When left in a desiccator for 1 to 5 days, the same copper was covered with the coating about 90-100 A. The patina formed under different environmental conditions were further analyzed. CU_2O forms in neutral water solution, but its percentage increases with an increase in temperature to such a degree that the corrosion products come to consist mainly of CuO at or about 80 C. When a third component exists in water, the corrosion is affected according to their density. Corrosion of aluminum in air and water were also studied. Water corrosion of aluminum was broken down into two: one in water of 70 C or lower, and the other in water of 80 C or higher. Heated at 400 C for 8 hrs or at 450 C for 4 hrs, the corrosion gave an apparent r-Al_2O_2 X-ray diffraction pattern.
APTIC-25727

ROTARY MACHINES FOR EXTREME CLIMATIC CONDITIONS.

(Tocive stroje pro extremni klimaticke podminky). Text in Czech. Elektrotech. Obz., 57 (10):556-560, 1968. 11 refs.
Bernarda Bartakova, and Jan Varak.
Identifiers: *Rotary machines, *Corrosion, *Micrometeorology, Czechoslovakia, Microorganisms, Dusts, Humidity, Rain, Temperature (atmospheric), Gases.

Whether it is necessary to design different types of rotary machines for different climate regions is studied. The universally usable rotary machine should be resistant to temperature variations between minus 65 - plus 55 C, to humidity 3-98%, to microbiological corrosion, insect, rain, dust, sand, and chemical pollution of the atmosphere. The effect of these individual climate factors on durability and performance of different machine parts is considered. Both from an economical and technological point of view, it appears more advantageous to produce only one type of rotary machine for all climatic regions. The design of machines should be selected in such a way as to limit climatic effects on concerned parts of the machine (e.g., to use a closed cover, to use a smooth surface of the cover to prevent dust or other pollution sedimentation, and to prevent water condensation on coils during the work break by heating.
APTIC-25741

A COMPARISON OF THE EFFECT ON RAYON FABRICS OF VARIOUS GASES UNDER CONTROLLED CONDITIONS.

Am. Dyestuff Reptr., 37 (12):391-396, June 14, 1948. 6 refs.
Frances Karr Ray, Pauline Beery Mack, Frederic Bonnet, and Arthur H. Wachter.
Identifiers: *Fading, *Synthetic fibers, *Nitrogen oxides, *Sulfur dioxide, Discoloration.

Controllable gas fading equipment is used in an experiment to determine the comparative effects of small quantities of oxides of nitrogen and sulfur dioxide, alone and in combination, on the color and strength of representative rayon fabrics. Six test fabrics representing various degrees of sensitivity to gas fumes were exposed to controlled amounts of gas. The experimental procedure and conditions are described, and the results are discussed. Of the gases used, oxides of nitrogen caused by far the greatest color changes. Sulfur dioxide caused little or no fading. The use of a combination of the oxides of nitrogen and of sulfur, under comparable conditions, caused more fading than the sulfur dioxide alone, but decidedly less than the oxides of nitrogen alone. The effect of the sulfur dioxide appeared to be to reduce fading action when used in combination with oxides of nitrogen, undoubtedly because of an interaction of the gases under the prevailing conditions. Nitrogen oxides caused fadings most similar to those occurring during exposure under use conditions. An apparatus for the control of temperature and humidity during gas fading determinations is described, and conditions of its use are suggested. None of the treatments used in this study caused significant changes in wet bursting strength, indicating that the problem of strength loss is not serious in this connection. (Author summary modified)
APTIC-25772

SURVEY OF CORROSION AND ATMOSPHERIC POLLUTION IN AND AROUND SHEFFIELD.

Brit. Corros. J., 3 (2):80-84, March 1968. 6 refs.
K. A. Chandler, and M. B. Kilcullen.
Identifiers: *Corrosion, *Steel, *Smokes, *Sulfur dioxide, Great britain, Stack gases.

The nature and extent of the relationships between the corrosion of two mild steels of different copper content, and atmospheric pollution were investigated at 11 selected sites in the Sheffield area. This was part of a general investigation into atmospheric corrosion of ferrous metals. The results confirmed that there was an important relationship between the corrosion of steel and the atmospheric pollution by smoke and sulfur dioxide. However, only about 50% of the variations in corrosion rates at different sites could be attributed to sulfur dioxide, measured in this investigation by the Volumetric Method. Smoke intensity had an influence on the corrosive rate of steel similar to that of sulfur dioxide but the correlation between sulfur dioxide and smoke was high, so that their effects on the corrosion rate could not be considered as independent. Their combined effect was only slightly greater than their individual effects. The corrosion rate could not be accurately predicted from a knowledge of the quantity of these two types of atmospheric pollution present in the atmosphere. (Author abstract)
APTIC-25848

CURRENT PROBLEMS OF THE THEORY OF ATMOSPHERIC CORROSION.

Prot. Metals (USSR) (English translation from Russian of: Zashch. Metal., 3 (2):112-116, March-April 1967. 21 refs.
K. Barton, and D. Cermakova.
Identifiers: *Research programs, *Corrosion, Czechoslovakia, Micrometeorology, Electrochemical methods.

Research on the mechanism and kinetics of atmospheric corrosion is taking place along the following lines: 1) electrochemical studies of atmospheric corrosion processes; 2) investigations

of the effects of atmospheric pollution; 3) investigations of the influence of corrosion products; and 4) investigations of the relation between prolonged exposure and the characteristics of different climatic regions. Attention is drawn to progress or lack of progress in each field and to specific problems requiring further study. A complex investigation of corrosion along all the lines indicated should permit the formulation of a precise theory of corrosion. development of scientifically-based engineering methods of protection against atmospheric corrosion.
APTIC-25937

A COMPARISON OF METHODS FOR TESTING THE FASTNESS TO GAS FADING OF DYES ON ACETATE.

For primary bibliographic entry see Field 03.
APTIC-26167

RESULTS OF FIVE YEARS EXPERIENCE WITH THE BEHAVIOR OF INSULATORS FOR MEDIUM VOLTAGE UNDER CONDITIONS OF NATURAL INDUSTRIAL POLLUTION.

(Une experience de cinq ans sur le comportement des isolateurs a moyenne tension sous pollution industrielle naturelle). Rev. Gen. Elec., 78 (4):411-416, April 1969. 1 ref. Translated from French by A. Marty, 9p., Sept. 1969.
P.-Y. Herbert.
Identifiers: *Insulators, *Materials deterioration, *Voltage, France, Maintenance.

Creeping voltage measurements were obtained, under conditions of intense industrial air pollution, for insulator chains commonly used in medium voltage networks. Performance of the insulators was compared by determining the voltage values below which the number of creepages that occurred was equal to one % of the number of measurements made in a given period. It was observed that horizontal chains perform better than vertical chains; vertical chains with three cap and pin elements perform better than those with two cap and pin elements; and performance of all insulators is improved by the application of silicon grease. The average value of the necessary creepage in industrially polluted areas is estimated to be 2 cm/kV between phases or 3.5 cm/kV phase to earth. For a network of 23 kV the required creepage distance will therefore, be about 450 mm. In cases of extreme pollution, it may be necessary to provide for higher values.
APTIC-26241

10. ECONOMIC ASPECTS

HERE'S WHAT SO2 REMOVAL COSTS.

Hydrocarbon Process., 46 (7): 161-164, July 1967. 7 refs. (Presented before the American Association of Cost Engineers, Cleveland, Ohio, July 11, 1967.)
Sidney Katell, and K. D. Plants.
Identifiers: *Costs, *So2 removal (combustion products), Stack gases, Steam plants, By-product recovery, Catalytic oxidation, Alkalized alumina (adsorption), Reinluft process (adsorption).

From pilot plant tests, capital and operating costs are estimated for three methods of removing sulfur dioxide from power plant stack gases: the Reinluft process using activated char; the alkalized alumina process; and the catalytic oxidation process. The second of these was calculated to have the lowest capital investment and operating costs. Credit for byproduct recovery is discussed, and cost factors for other processes, including a Japanese catalytic oxidation system and methods using dolomite, limestone, or phosphate rock are briefly reviewed.
APTIC-22444

MARKET SITUATION OF POLLUTION CONTROL EQUIPMENT.

(Markt- und Absatzlage fuer Luftreinhaltungsanlagen). Text in German. Staub, Reinhaltung Luft, 30 (8):327-328, Aug. 1970.
Personal Author Not Recorded.
Identifiers: *Costs, *Germany, *Dusts, *Control equipment, Federal governments, Smokes, Centrifugal separators, Electrostatic precipitators, Filters, Scrubbers, Statistical analyses.

West German government statistics of the production, export, and import for 1967, 1968, and the first half of 1969 of dust arresters, dust and gas separation installations, and smoke gas dust removal equipment amounted to 107.914, 107.139, and 67.029 (production); 42.821, 55.300, and 28.764 (export); and 7.796, 9.396, and 7.179 (import), in 1000 DM respectively (approximately $250.00). Coarse and fine dust air filters, suspended particle air filters, electro-air filters, cloth screen dust arresters, cyclones, dry and wet electric dust arresters, waste gas purification installations, industrial vacuum cleaners and equipment spare parts produced and exported in West Germany in 1968 and the first half of 1969 amounted to 90.182 and 53.553 (production); 58.540 and 51.267 (export) in 1000 DM respectively. These latter statistics were compiled from an industry-wide survey conducted by the industry itself.
APTIC-24650

PIPELINE GAS FROM LIGNITE GASIFICATION: CURRENT COMMERCIAL ECONOMICS.

Consolidation Coal Co., Library, Pa., Research Div. Contract No. 14-01-0001-415, R and D Report No. 16 - Interim Report No. 4, 40p., May 9, 1969. 4 refs. CFSTI: PB 184721
James T. Clancey, Uwe D. Marwig, and Donald R. Lindahl.
Identifiers: *Costs, *Gasification (synthesis), Pressure.

The commercial aspects of the Consol CO2 Acceptor Process for producing pipeline gas from lignite are considered with respect to two designs and current costs of material and labor. The two design cases in the study consider a straightforward commercial approach – that is, lignite, water, and air are processed to produce pipeline gas at a rate of 250 billion Btu/day. The gas produced meets or exceeds specifications set by the Office of Coal Research. The cold-gas thermal efficiency of the plant is 62.5% at 150 psi and 59.2% at 300 psi. At the 150 psi level, lignite at 8 cents/MM Btu results in a pipeline gas price of 38.1 cents/MM Btu; the corresponding gas price for 11 cents/MM Btu lignite is 43.1 cents/MM Btu. At the 300 psi level, gas prices are from 1.2 to 1.5 cents/MM Btu higher. In the four years since the feasibility of the process was first studied, the pipelines gas price has increased by 4.5 cents/MM Btu. Of this increase, approximately 1.2 cents/MM Btu is directly due to a necessarily lower process thermal efficiency, and the remainder to inflation of both material and labor costs. The necessarily lower thermal efficiency results from the need to operate the regenerator for the dolomite acceptor used by the process at lower pressure to avoid formation of calcium deposits.
APTIC-24727

COSTS OF CONTROLLING GRAY IRON CUPOLA EMISSIONS.

Foundry, 98 (12): 53-55, Dec. 1970. 2 refs.
Personal Author Not Recorded.
Identifiers: *Abatement, *Costs, *Cupolas, Iron, Stack gases, Particulates, Primary metallurgical processing, Control equipment, Afterburners, Scrubbers, Control methods, Carbon monoxide.

A joint survey was made by the National Air Pollution Control Administration and the U. S. Dept. of Commerce to establish data on present levels of control for particulates and carbon monoxide in the gray iron foundry industry. Gas cleaning equipment such as wet scrubbers, in combination with afterburners, can reduce the emission levels of particulates and carbon monoxide from cupolas to achieve compliance with the process weight rate standard for particulates and 95% removal for carbon monoxide. The assumed emission standards selected for this report would require the industry to increase its present average removal efficiency of 12% for particulates to 90% control of CO, presently 18%, would be increased to 95%. Basic data and information required to estimate air pollution control costs for the gray iron industry consisted of an evaluation of various production processes; and analysis of the pollutants involved and their uncontrolled emission rates; and an engineering evaluation to select the most satisfactory control systems to achieve the required levels. Data describing features of all gray iron foundries that operate cupolas were obtained by the Dept. of Commerce during a 1968 mail survey, and a representative sample of 67 foundries with cupolas was visited by NAPCA personnel to obtain extensive data on control systems. Estimated control costs are presented tabularly. (Author abstract modified)
APTIC-24827

THE WORLD SUPPLY OF SULFUR.

In: Problems and Control of Air Pollution. F. S. Mallette (ed.), New York, Reinhold, 1955, Chapt. 13, p. 133-142. 10 refs.
J. C. Carrington.
Identifiers: *Sulfur compounds, *Consumption, *Production.

Sulfur, one of the essential materials for industry and agriculture, occurs in abundance throughout the world. The forms in which it is commonly found include native sulfur, or brimstone; metallic sulfides, principally pyrites; sulfide gas associated with natural gas and petroleum; and natural sulfates. In 1953, the estimated free world production of sulfur was about 12,700,000 tons and the estimated consumption about 12,500,000 tons. Of the free world consumption, the Western Hemisphere accounted for 46% and the Eastern Hemisphere for about 54%. The Western Hemisphere produced substantially more than it consumed, and a considerable part of the consumption of Eastern Hemisphere nations was supplied by imports from the west. The present supply-demand picture is one of production and productive capacity ample to meet the full demand. The total productive capacity that has been added in the past two years or is in prospect for the next few years is estimated at 5,000,000 tons per year.
APTIC-24917

TRENDS IN THE UTILIZATION OF THE MOST IMPORTANT FORMS OF SULFUR-CONTAINING RAW MATERIAL.

For primary bibliographic entry see Field 02.
APTIC-25938

REMOVAL OF SULFUR FROM FUELS AND PRODUCTS OF COMBUSTION.

For primary bibliographic entry see Field 02.
APTIC-25961

ECONOMIC PROJECTIONS FOR AIR QUALITY CONTROL REGIONS.

Dept. of Commerce, Washington, D. C., Regional Economics Div., 178p., June 1970. NTIS: PB 195805
Personal Author Not Recorded.
Identifiers: *Socio-economic factors, *Air quality control regions, *Trends, Planning and zoning.

Population, personal income, earnings, and earnings by industry for 55 Air Quality Control Regions are projected for the years 1965, 1970, 1975, and 1980. The projections will provide a basis for estimating future pollutant emissions in the Air Quality Control Regions. They were derived by the Office of Business Economics in a procedure

that called for projections of summary national totals, which were then disaggregated into national industry components. The nation industry components, in turn, were disaggregated to the Air Quality Control Regions. Section I of this report discusses briefly the nature of projections in general, the measures used for these projections, and presents the projections themselves. Section II describes how the projections were generated and specifies the underlying assumptions.
APTIC-25993

PRODUCTION AND COST OF LEADLESS GASOLINE.

For primary bibliographic entry see Field 02.
APTIC-26021

MANUFACTURERS' REPORT OF AIR POLLUTION CONTROL EQUIPMENT SALES.

Contracts CPA 22-69-5 and CPA 70-18, 8p., 1969.
NTIS: PB 196828
Personal Author Not Recorded.
Identifiers: *Costs, *Control equipment, Particulates, Chemical processing, Electric power production, Food and food operations, Metal fabricating and finishing, Mining, Paper manufacturing, Petroleum production, Primary metallurgical processing, Printing, Domestic heating, Collectors, Electrostatic precipitators, Filters, Scrubbers, Absorption, Catalytic oxidation.

Air pollution control equipment sales are summarized for the years 1966, 1967, and 1968. Particulate control apparatus includes wet scrubbers, fabric filters, mechanical and electrostatic methods. The number of devices sold and the total amount of money obtained are indicated according to industrial classification. Gaseous control equipment includes catalytic oxidation, direct combustion, thermal oxidation, and an absorber.
APTIC-26193

LEGISLATING FOR AIR QUALITY MANAGEMENT: REDUCING THEORY TO PRACTICE.

For primary bibliographic entry see Field 12.
APTIC-26285

DUST AS RAW MATERIAL AS A SOURCE OF LOSS AND OF GAIN.

(Staub als Rohstoff, Verlust- und Gewinnquelle). Text in German. Chem. Ing. Tech. Z., 25 (8/9):433-437, Aug./Sept. 1953. 2 refs.
Leo Dietrich.
Identifiers: *Dusts, *Control methods, *Economic losses, Costs, Cements, Metals, Germany, Fly ash, Coal, Chemical processing, Food and food operations, Mineral processing.

Dust recovery processes in operation in West Germany in 1952 in the production of anthracite and bituminous coal, in iron and copper smelting, in the production of zinc from zinc blende, in the production of aluminum in calcining furnaces, in the cement industry, in pulverizers used in the chemical and food industries (dried milk, detergents) and in power plants are reviewed. Of a total production of 289.7 million tons of materials, 34.2 million tons (11.80%) were emitted in powder form. Of this quantity, 32.2 million tons (94%) were recovered; 1.98 million tons or 6% of all dust emitted was lost, representing a loss of considerable magnitude. In some industries, dust recovery technology has reached it limits, in others it has not. Thus, fly ash emitted from power plants amounted to 7.8 million tons, of which 82.5% was removed; 1.43 million tons were emitted into the atmosphere, 80% in the Ruhr area.
APTIC-26239

11. STANDARDS AND CRITERIA

THE 1968 ANNUAL REPORT OF THE STATE INSTITUTE FOR IMMISSION AND SOIL PROTECTION OF THE STATE OF NORDRHEIN-WESTFALEN IN ESSEN.

For primary bibliographic entry see Field 12.
APTIC-24612

PROPOSAL FOR A UNIFORM EVALUATION OF THE DANGER OF PNEUMOCONIOSES.

For primary bibliographic entry see Field 07.
APTIC-24649

'AUTOMOTIVE' IS THE DIRTY WORD IN SMOKE EMISSION BS.

Engineer (London), 231 (5984):15, Oct. 1, 1970.
Personal Author Not Recorded.
Identifiers: *Equipment standards, *Great britain, *Diesel engines, Technical societies, Engine exhausts, Smokes, Automobiles, Density.

Most diesel engine makers have been testing and rating their products in accordance with BS AU 141 for some time, but until now few have actually submitted engines for type approval by the British Standards Institution. The significance of BS AU 141 testing lies in the fact that the standard lays down stringent limits on exhaust smoke density. Probably the most critical problem of adopting BS AU 141 as a legal basis for rating automotive engines is determining what is 'automotive'. For example, BS 649 which controls construction and industrial engine rating is used in many instances, and rating to the BS 649 method is much less stringent than BS AU 141 in that it has no smoke emission limitation. BS AU 141 involves a 100 hour endurance run at maximum rev/min and idle.
APTIC-24677

PROPERTIES OF OZONE AS AN INDUSTRIAL POISON.

For primary bibliographic entry see Field 07.
APTIC-24741

THE MEASUREMENT OF AIR POLLUTION AND THE ESTABLISHMENT OF CRITERIA FOR THE EVALUATION OF AIR QUALITY.

(Die Messung der Luftverunreinigungen und die Aufstellung von Kriterien fuer Beurteilung der Luftqualitaet). Air Pollution Proc. First European Congr. Influence Air Pollution Plants Animals, Wageningen, Netherlands, 1968, p. 287-301. Translated from German. Belov and Associates, Denver, Colo., Oct. 8, 1970.
H. Stratmann.
Identifiers: *Mathematical analyses, *Air quality criteria, *Emission standards, Germany, Sulfur dioxide.

Air quality criteria are valuable with respect to suspected or actual effects of air pollution. They are derived in turn from criteria which describe, respectively, emission and effects criteria. A model is presented for formulating a relationship between suitable emission criteria and the corresponding effects criteria. The model, which represents the average conditions of various groups of objects, can be used for estimating possible damages and should serve as a basis for establishing emission limits. Also discussed are measuring techniques and their application to emission control.
APTIC-24907

ATTEMPT TO DEFINE THE EXPOSURE LIMITS OF CONCENTRATION FOR SO2, CL2, H2S, AND THE NITROGEN OXIDES IN AN URBAN ATMOSPHERE.

(Essai de definition de la limite administrative de concentration pour SO2, CL2, H2S et les oxydes d'azote dans l'atmosphere des villes). Text in French. Tribune CEBEDEAU, 21 (301):666-673, Dec. 1968. 6 refs.
M. Bonaric, and B. T. Chuong.
Identifiers: *Air quality criteria, *Maximum allowable concentration, *Mathematical analyses, *Gases, Belgium, Urban areas, Data analysis, Ammonia, Chlorine, Carbon monoxide, Nitrogen oxides, Sulfur dioxide, Ozone, Carbon disulfide, Hydrogen sulfide.

A five-point rating scale was used to evaluate the relationship between the concentration of the sulfur dioxide, chlorine, hydrogen sulfide, and nitrogen oxides and their effect on humans: 1. threshold perception. 2. Perceptible, but with no apparent damage. 3. Irritation or slight symptoms. 4. Intolerable, serious symptoms. 5. fatal. Whereas there is a wide range of difference in observations as to the concentrations of the above that fit the five categories, it was discovered that for any 2 categories there was a remarkably constant proportional relationship, and that these ratios, to a high degree of approximation, were the same for all of these toxic substances, and also for ozone, ammonia, and carbon disulfide. An analogous regularity occurs in the case of carbon monoxide, but the ratio differs numerically from that of the other seven toxic substances. Accepting this finding at face value, it is possible to work backward and empirically determine values for all five categories of effects, provided the concentration for at least one such category is already known. On this basis, whose mathematical principles are discussed, the following admissible limits for an average concentration over a 24-hour period amount to 80 ppm for carbon monoxide, 2.5 ppm for carbon disulfide, 0.016 for the oxides of nitrogen, 0.02 for hydrogen sulfide, 0.025 for chlorine, and 0.25 for sulfur dioxide. The admissible limits presently enforced in West Germany, the USSR, and Canada compare favorably with the results of this study.
APTIC-24941

REVIEW OF TENTATIVE ABORT, ALERT, 100 AND 1000-DAY LIMITS FOR SPACE CABIN CONTAMINANTS.

Proc. Conf. Atmos. Contamination Confined Spaces, 4th Ann., Wright-Patterson AFB, Ohio, 1968, p. 14-23. (Sept. 10-12; Paper 2, discussion included.) CFSTI, DDC: AD-855 001
Roy E. Albert.
Identifiers: *Maximum allowable concentration, *Pollutants, *Spacecraft atmospheres, Continuous, Hourly, Thresholds, Toxicity, Carbon monoxide.

The Panel on Air Standards for Manned Space Flight of the Space Science Board, National Academy of Sciences, was asked to examine the likelihood of adverse effects of air contaminants on the health and performance of space crews on prolonged missions; subsequently, the charge was expanded to include consideration of limits for exposure to air contaminants under emergency conditions. Reports of the analyses of atmospheric contamination detected in a variety of closed environments were reviewed: seven manned space flights, seven ground-based simulated cabin atmospheres, nuclear submarines and Sealab experience and analysis of off-gas products and cabin materials. Limit values were derived from the air concentration which produced the earliest significant toxicological response, and the nature of the threshold responses produced by the compounds under study is presented tabularly. Carbon monoxide, among all the spacecraft contaminants presently known or envisaged for the immediate future, held a preeminent place of concern to the Panel as possibly the limiting toxicant. Allowable limits for peak exposures, not to exceed 60 minutes, are also presented tabularly for five substances which might be released accidently within the spacecraft.
APTIC-24957

CUPOLA DUST REMOVAL WITH REGARD TO THE PROJECTED STANDARD VDI 2288 ON 'LIMITATION OF DUST EMISSION FROM CUPOLAS'.

For primary bibliographic entry see Field 02.
APTIC-25548

CONSIDERATIONS IN DEVELOPING AIR QUALITY CRITERIA.
Preprint, National Air Pollution Control Administration, Durham, N. C., Bureau of Criteria and Standards, 5p., 1970. (Presented at the Conference on Environmental Toxicology, Fairborn, Ohio, Sept. 6-11, 1970.)
F. G. Hueter, J. C. Romanovsky, and D. S. Barth.
Identifiers: *Control agencies, *Air quality criteria, *Federal governments, Advisory services, State governments, Air quality standards.

The National Air Pollution Control Administration's air criteria documents are intended to make adequate background material available to state officials responsible for adopting ambient air quality standards. The criteria documents are, therefore, expected to describe concentrations, exposure times, meteorological interactions, and other potentiating influences that are associated with health, welfare, and economic effects directly attributable to the contaminant in question or indirectly attributable to some analog of the contaminant. Air quality criteria include rigorous measurement methodology. They also provide information on chemical contaminants in order to facilitate the rational development of control strategies. The law requires that air quality control criteria be reviewed by the scientific community and by other Federal agencies before being issued to the states. The scientific community is primarily reflected in the National Air Quality Criteria Advisory Committee which is made up of as many as 15 authorities from universities, industry, and local and state governments. The criteria documents are additionally reviewed by a large number of scientists outside the committee. (Author summary modified)
APTIC-25575

CONTROL OF AUTOMOBILE EMISSIONS-CALIFORNIA EXPERIENCE AND THE FEDERAL LEGISLATION.
For primary bibliographic entry see Field 12.
APTIC-25591

AESTHETIC DIESEL SMOKE LEVELS IN BOTH ACCELERATION AND LUG DOWN ARE SET TO BEGIN IN JANUARY 1970.
S.A.E. (Soc. Automot. Engrs.) J., 77 (4):58-61, April 1969. 4 refs.
Personal Author Not Recorded.
Identifiers: *Emission standards, *Diesel engines, *Smokes, Enforcement procedures, Federal governments, State governments, Measurement methods, Simulation.

As of January, 1970, engine manufacturers must certify that all new diesel engines installed in highway vehicles over 6000 lb gross vehicle weight meet federal smoke standards. The federal test cycle simulates maximum smoke conditions encountered in highway operations and smoke limits are set in both acceleration and lugging modes. The acceleration limit is considered to be more difficult for typical turbocharged engines to meet while the lugging standard is more difficult for typical naturally aspirated units. Individual states are responsible once the vehicle is on the road, but state enforcement and surveillance is currently handicapped by lack of suitable meters and test procedures. The federal test cycle is described.
APTIC-25619

THE ATMOSPHERE TESTING DILEMMA.
For primary bibliographic entry see Field 03.
APTIC-25821

THE TOXICOLOGICAL BASIS OF THRESHOLD LIMIT VALUES: 1. EXPERIENCE WITH THRESHOLD LIMIT VALUES BASED ON ANIMAL DATA.
Am. Ind. Hyg. Assoc. J., vol. 20:341-345, Oct. 1959. 53 refs. (Presented at the American Industrial Hygiene Association, 20th Annual Meeting, Chicago, Ill., April 25-May 1, 1959.)
Henry F. Smyth Jr.
Identifiers: *Maximum allowable concentration, *Occupational health, *Thresholds, Laboratory animals, Toxicity.

The best information we have on the greatest concentrations of respirable substances which are acceptable in the working environment is the accumulated experience of the profession of industrial hygiene, expressed in the annually revised list of threshold limits. Limits originally based upon repeated inhalation studies with animals have stood up under several years scrutiny and experience as well as have those based upon industrial surveys. The 45 substances are listed for which the first proposed threshold limit was based upon repeated inhalation by or feeding to animals, together with references to the stated or inferred published data. The basis for later changes in each threshold limit is also given. Analysis of the details of the studies which underlie threshold limits gives no clear guide to the design of future toxicological studies, but it does emphasize the need for applying a safety factor when a threshold limit is based on toxicity studies. (Author summary modified)
APTIC-25917

EXAMINATION OF THE BEHAVIOR OF HIGH VOLTAGE INSULATORS UNDER POLLUTION CONDITIONS, USING A CONVENTIONAL TESTING METHOD, WITH PARTICULAR REFERENCE TO THE SELF-CLEANING APTITUDE.
(Examen du comportement d'isolateurs haute tension sous pollution par une methode d'essai conventionale faisant ressortit les proprietes d'auto-nettoyage). Rev. Gen. Elec., 78 (14):417-428, April 1969. 19 refs. Translated from French by A. Harty.
H. Meier.
Identifiers: *Equipment standards, *Insulators, *Self-cleaning, *Voltage, France, Rain.

A method is presented for rapidly determining the self-cleaning aptitude (by natural rain or artificial washing) of insulators exposed to artificial pollution by deposits. An insulator receives a uniform pollution layer of well-defined surface conductivity (in wet condition). The surface conductivity is equal to conductance of the layer as measured by two parallel electrodes of unit length, separated by a distance of unit length. The insulator is then subjected to voltage and creepage current and creepage voltage are measured during a period of artificial rain. A maximum duration of one hour appears sufficient for the test. Comparative performance data is given for different types of 'long rod' insulators and 'cap and pin' insulators.
APTIC-25926

INORGANIC FLUORIDES.
Am. Ind. Hyg. Assoc. J., 30 (1):98-101, 1969. 21 refs.
Personal Author Not Recorded.
Identifiers: *Plants (botany), *Air quality criteria, *Animals, *Fluorides.

Inorganic fluorides are ubiquitous; they are found naturally in most soils, water, vegetation, and animal tissue. In the small amounts present, they produce no harmful effects and are considered by many nutritionists as essential minor elements. They are important as air pollution since excessive amounts can produce damage both in vegetation and in animals that consume contaminated forage. The fluoride content of forage should not exceed 40 ppm F as a yearly average, be in excess of 60 ppm F for more than two consecutive months, or in excess of 80 ppm F for more than one month. Values of gaseous fluorides suitable as an air quality guide for residential and agriculture areas are as follows: 4.5 ppb average for 12 hrs; 3.5 ppb average for 25 hrs, 2.0 ppb average for 1 wk; and 1.0 ppb average for 1 month.
APTIC-25933

THRESHOLD LIMIT VALUES FOR CARBON MONOXIDE.
Arch. Environ. Health, 21 (4):542-544, Oct. 1970. 11 refs.
Aage Grut, Poul Astrup, Peter J. R. Challen, and Gideon Gerhardsson.
Identifiers: *Thresholds, *Maximum allowable concentration, *Carbon monoxide, Carboxyhemoglobin, Occupational health, Blood vessels, Europe.

A carboxyhemoglobin level (COHb) of 13% may produce an increase in vascular permeability; a COHb level of 15% may enhance cholesterol uptake in the intima of the vessels and give rise to injuries of the arterial wall resembling arteriosclerosis. These are objective findings that can be included in the threshold limit value (TLV) for carbon monoxide. Since the TLV should be a concentration below the appearance of adverse symptoms a TLV of 50 ppm is recommended for CO which in air would produce a COHb of about 8-10%. Peak values, defined as repeated daily events, are not justified in industrial situations. The emergency values suggested for CO are 40 ppm for one hr and 1000 ppm for 20 min. All values mentioned should be critically reviewed in about five years after further epidemiological information is obtained on the influence of constant exposure to low CO concentrations.
APTIC-26103

AIR POLLUTANT ANALYSIS.
For primary bibliographic entry see Field 03.
APTIC-26106

12. LEGAL AND ADMINISTRATIVE

GUIDELINES FOR THE DEVELOPMENT OF AIR QUALITY STANDARDS AND IMPLEMENTATION PLANS.
53p., May 1969. 33 refs.
Personal Author Not Recorded.
Identifiers: *Control programs, *State governments, *Air quality standards, Air pollution episodes, Control agencies, Air quality criteria, Enforcement procedures, Federal governments, Legal aspects, Clean air act, Planning and zoning, Meetings, Public information, Emission inventories.

A series of guidelines are presented to furnish State governments with guidance in performing the functions of establishing air quality standards and adopting plans for implementation of the standards. The Air Quality Act of 1967 calls for the establishment of air quality control regions and criteria for the prevention and control of air pollution. The role of State governments under the provisions of this Act is discussed. The procedures for development of air quality standards, including public hearings and participation, time schedules, surveillance, and legal authority, are described. Procedures for handling air pollution episodes are outlined, as are procedures for obtaining Federal assistance or grants. A list of desirable emission inventory data for use with modeling in the development of control strategies is provided, along with a list of air quality control regions and regional air pollution control directors.
APTIC-12494

PROGRESS IN STATE AND LOCAL AIR POLLUTION CONTROL UNDER THE CLEAN AIR ACT.
Preprint, National Air Pollution Control Administration, Arlington, Va., Div. of Control Agency Development, 9p., 1969 (*). (Presented at the American Industrial Hygiene Conference, Denver, Colo., May 14, 1969.)
Charles D. Yaffe.
Identifiers: *Control agencies, *State governments, *Clean air act, Administration, Costs, Federal governments, Regional governments, Planning and zoning, Regulations, Public affairs.

Most States have the authority for State control of air pollution. The development of this authority is related to the continued growth of air pollution, the public's recognition of the problem, the impact of Federal financial assistance, and the stimulus of National legislation such as the Clean Air Act. A review of Federal expenditures to State and local control programs is presented. A summary of information concerning the kinds and rates at which various types of regulations have been adopted by State control agencies is given. Administrative regulations are the most numerous, followed by those dealing with visible emissions and open burning. On complex problems, the trend is toward setting a schedule within which specified control measures are to be completed. One indication of response to public demand for air pollution control has been legislative action to increase maximum penalties for violations. The amendments to the Clean Air Act establishing a mechanism for air pollution control on a regional basis are discussed.
APTIC-12495

REPORT FOR CONSULTATION ON THE METROPOLITAN PROVIDENCE INTERSTATE AIR QUALITY CONTROL REGION (RHODE ISLAND-MASSACHUSETTS).

57p., July 1969. 6 refs.
Personal Author Not Recorded.
Identifiers: *Area surveys, *Planning and zoning, *Massachusetts, *Rhode island, Control programs, Air quality criteria, Regional governments, Clean air act, Socio-economic factors, Seasonal, Urban areas, Particulates, Industrial emission sources, Incineration, Open burning, Transportation, Air quality measurements, Diffusion models, Point sources, Carbon monoxide, Sulfur dioxide.

The Air Quality Act of 1967 calls for the designation of 'air quality control regions' as an initial step toward the establishment of regional air quality standards. The Providence, R. I., and Fall River-New Bedford, Mass. interstate urban area is designated as one of these regions. The results of a study of this area by NAPCA are presented. The general objectives in determining the size of the area are presented, and the procedures involved in finally designating the area are discussed. An emission survey of the area provides a breakdown of sulfur dioxide, particulates, and carbon monoxide for the sources of transportation, industrial, fuel combustion, refuse disposal, and others. Geographic source locations are defined, and major point sources are located. An air quality analysis, including diffusion model, was conducted in order to determine geographic and seasonal variations in air quality. An evaluation of urban factors, including population, industry, existing regional arrangements, and existing air pollution control programs and legislation, was made in order to more fully determine where the exact boundaries of the region should be placed. The air quality control region is proposed subject to consultation with local authorities, and the proposal, is discussed fully.
APTIC-12569

AUTOMOTIVE POLLUTION CONTROL.

In: Mass Transit and The Highway Trust Fund. Harvard School of Law, Cambridge, Mass. and Harvard Graduate School of Arts and Science, Cambridge, Mass., Dept. of Housing and Urban Development Grant H-1043, Rept. MASS-R6-11-69, p. 39-43, Jan. 1970 CFSTI: PB 19051
Donald N. Dewees, and J. Michael Hines.
Identifiers: *Automotive emission control, *Proposals, *Taxation, *Highway trust fund (htf), Federal governments, Gasolines, Automobiles.

A proposal is made that federal efforts to reduce automobile air pollution, including the present automotive pollution control activities of the National Center for Air Pollution Control, be financed by the Highway Trust Fund (HTF). Inclusion of pollution control in the HTF will further the goal of everyone's paying his fair share. If the program is expanded as the need for pollution control rises, then the burden on motorists who cause pollution will be in proportion to the amount of their activity. Payment of a gas tax is seen as a first step toward actually charging the motorist for the cost his pollution imposes on others. The revenues obtained from user taxes will permit more productive activities than could be produced under other methods of funding. Moreover, federal funding is justified by federal interest in establishing and enforcing national vehicular pollution standards.
APTIC-23390

POLLUTION CONTROL: A CORPORATE DILEMMA.

Instrum. Technol., 17 (7):34-36, July 1970.
(Presented at the ISA Chemical and Petroleum Instrumentation Symposium, 11th National, Chicago, Ill., 1970.)
William B. Halladay.
Identifiers: *Abatement, *Commercial firms, *Management personnel, Federal governments, Legislation, Socio-economic factors.

Some of the factors in fighting pollution at the corporate level include huge capital investments, inadequate technology, changing standards of air and water quality, and an aroused public demanding quick solutions. At the federal level, far too much division of responsibility and authority prevails, and the time has come for a consolidation of these related activities into an environmental 'watchdog' agency or department. Legislation without technological capabilities or adequate financing is futile. Every company should have a specialist whose job it will be to be keenly aware of existing, pending, and probably future legislation, to spark suggestions and implementation of conservation programs within various line organizations, to assist in making policy, and to keep abreast of pertinent technological advances. Only with cost awareness, however, can programs and actions be realistically scheduled within the company's capital framework and expenditure. The company should urge employees at all levels to become involved in community leadership programs and projects relating to an improved environment.
APTIC-23612

APPLICATIONS OF AEROSPACE TECHNOLOGY IN AIR POLLUTION CONTROL.

Contract NASW-1950, RTI Rept. EU-469, Quarterly Progress Rept. 1, 29p., Sept. 14, 1969. CFSTI: N70-28161
Personal Author Not Recorded.
Identifiers: *Computers, *Data handling systems, *Advisory services, *Federal governments, Control agencies, Measurement methods, Control methods.

The Technology Utilization Division of the National Aeronautics and Space Administration is making extensive and concentrated efforts to apply the scientific and technological knowledge gained in the nation's aerospace programs in order to solve or aid in the solution of problems in the public sector. An evaluation of the activities in the specific area of air pollution is presented. The general methodology that has been employed can be subdivided into four major phases of activity: problem identification and specificiation; identification of relevant information or technology; evaluation of potentially applicable information or technology; and documentation. Of 41 problems identified, 21 were selected on the basis of priority, and computer searches were initiated to obtain relevant information. Two technology transfers have resulted from the searches. A complete list of the active problems is presented, and technology transfer and potential transfer reports are included. Some of the problems mentioned are control methods for various pollutants, measurement methods, and the effects of pollutants on humans.
APTIC-23866

A SUGGESTED PROGRAM FOR THE SACRAMENTO REGION.

In: The Air Pollution Threat. Sacramento Regional Area Planning Commission, Calif., Technical Paper -8, 5p., Oct. 1969. CFSTI: PB 191382
W. L. Faith.
Identifiers: *Administration, *Sacramento, *Air quality control region, Budgets, Plans and programs, Control agencies, Regional governments, Planning and zoning, Personnel, California.

The establishment of a regional district covering the same area as that included in the boundaries of the Sacramento Regional Area Planning Commission is suggested as the most appropriate form of air pollution control agency for the Sacramento area. Major functions would include development and administration of control regulations, administration of the permit system required to gain Federal financial support, measurement of emissions and air quality, maintenance of enforcement program, and various public information, government liaison, laboratory, and other support activities. An initial staff of 18 would operate the Director's office and engineering, technical, and field services. Suggested annual budget for the agency would be $266,250 with about a fourth from the counties involved; the District may be eligible to receive the balance from Federal assistance programs.
APTIC-24059

EXAMPLES OF TECHNOLOGY ASSESSMENTS FOR THE FEDERAL GOVERNMENT.

George Washington Univ., Washington, D. C., Program of Policy Studies in Science and Technology, NASA Grant NGL 09-010-030, Staff Discussion Paper 208, 44p., Jan. 1970. (Presented at the Hearings before the Subcommittee on Science, Research, and Development, Committee on Science and Astronautics, Dec. 2, 3, 4, 8, 12, 1969.)
Vary Taylor Coates.
Identifiers: *Advisory services, *Federal governments, Administration, Personnel, Data-handling systems.

Technology assessments by the Federal government fall into three main categories: the interdepartment efforts, the work of a distinguished panel, and the staff efforts. Interdepartment efforts are usually carried out by a panel or committee of high-level agency officials. These efforts are frequently focused on a social problem area, such as the environmental problem, and are concerned with coordinating and improving overall general programs in the area. At its best, the interdepartment study is more likely to make marginal improvements in existing Federal programs than to produce new insights about the social impacts of technologies. Members of distinguished panels often have institutional connections that make it difficult for them to exercise a public interest orientation. A glance at space panel reports, for example, is enough to show that half their members have aerospace connections. In addition, a distinguished panel cannot be a continuing assessment, nor does it necessarily generate new expertise within the government. Staff panels, such as a senate panel on low-emission vehicles, can sometimes have a preponderance of lawyers. However, these panels are more likely to bring fresh insight to old problems and, being detached from industry and use groups, to exercise a critical faculty. Moreover, staff assessments also tend to build a store of knowledge and expertise within the government and thus encourage a continuous monitoring of a problem or the development of a technology. Staff research, however, must be expanded to include use of computers, simulation techniques, and model building. Also needed are data retrieval systems.
APTIC-24604

A PRELIMINARY EXPLORATION OF THE RELATIONSHIP BETWEEN AIR POLLUTION AND CITY DATA.

University of Southern California, Los Angeles,
Public Systems Research Inst., 30p., 1970 (*).
Harvey M. Adelman.
Identifiers: *City governments, *Data analysis, Control agencies, Regional governments, Data-handling systems.

A preliminary study was made of the extent to which the data available from the routine operations of city government fill the information needs of regional air pollution control agencies, as an initial step towards development of a pollution information subsystem. The functions and data requirements of control agencies are specified in detail, as well as the data maintained as a by-product of normal urban government. Analysis shows that in two areas, sensing and telemetering and investigation of meteorological conditions, the necessary data are essentially unavailable to the city. Otherwise, the results indicate that information about the city is not distinct from information about air pollution but is the same information viewed from different perspectives. If the city data can be extracted, designed, and stored according to pollution agency needs, it can provide a meaningful support to air pollution management.
APTIC-24611

THE 1968 ANNUAL REPORT OF THE STATE INSTITUTE FOR IMMISSION AND SOIL PROTECTION OF THE STATE OF NORDRHEIN-WESTFALEN IN ESSEN.

(Schriftenreihe der Landesanstalt fuer
Immissions-und Boden- nutzungsschutz des
Landes Nordrhein-Westfalen in Essen. Jahres
bericht 1968). Text in German. Rept. 14, p. 7-69.
1969. 36 refs.
Personal Author Not Recorded.
Identifiers: *Air quality measurement programs, *State governments, *Germany, *Air quality measurements, Area surveys, Control agencies, Education, Personnel, Air quality standards, Equipment standards, Plant damage, Control equipment, Computer programs, Data analysis, Instrumentation, Testing facilities.

Activities are reported of the six departments of the Institute which in 1968 had 300 employees of which 36 were scientific workers. Department I is the personnel and administrative department. Department II is concerned with the measuring of emission levels of pollutants, with the development of emission test procedures and of test equipment and statistical evaluation and computerization of data. Department III is concerned with projected emission trends by industries, with the methodology of testing procedures, with research and development of pollution control, with information exchange and public education. Department IV is concerned with the effects of pollution on plant life as a basis for the determination of maximal permissible emission levels, with biological pollution testing methods, with the effect of pollutants on materials and with experimental work in laboratory and field. Department V is concerned with the effects of ground water loss on the ecology, with the effect of local water conservation measures on soil utilization, with water conservation planning, with the effect of pollution on soil and water and with recultivation of eroded areas. Department VI is concerned with the determination and control of noise pollution.
APTIC-24612

ENVIRONMENTAL PROTECTION IN THE CITY OF NEW YORK.

Science, 170 (3959):706-712, Nov. 13, 1970. 9 refs.
Merril Eisenbud.
Identifiers: *Control agencies, *New york city, Abatement, Budgets, Plans and programs, City governments, Urban areas, Water pollution.

New York City's Environmental Protection Administration (EPA) was created in March 1968 to consolidate former administratively separate functions concerned with environmental hygiene. With its formation, EPA became responsible for street sanitation, water supply, water pollution control, air pollution, and noise abatement. It is an organization of more than 20,000 employees, with an annual operating budget of about $275 million and a construction program of more than $2 billion during the next five years. Progress made during the first two year's of the program is noted as are technical, legal, and political problems that complicate urban pollution control. It is emphasized that in the long run, environmental protection must go beyond pollution and ultimately deal with other pressing urban problems including population control, poverty, raw materials conservation, vehicular traffic management, and land planning.
APTIC-24636

LEAD IN EXHAUST GASES.

For primary bibliographic entry see Field 04.
APTIC-24757

PROBING THE LAW AND BEYOND: A QUEST FOR PUBLIC PROTECTION FROM HAZARDOUS PRODUCT CATASTROPHES.

Preprint, George Washington Univ., Washington,
D. C., Program of Policy Studies in Science and
Technology. Paper 402, 57p., July 1969. 93 refs.
NTIS: PB 192 538
James M. Brown.
Identifiers: *Legal aspects, *Public affairs, Smog, Explosions, Reactors (nuclear), Water pollution.

The producer, shipper or carrier of any hazardous product takes a calculated risk that he may impose injury or damage upon an 'innocent bystander' whenever he inserts such a product into the flow of commerce. The public official who permits the production or movement of such products takes a calculated risk that protective controls which he demands may not be adequate to protect his constituency from harm. The general public trusts that its exposure to potentially dangerous products will be protectively managed by those who are officially or morally responsible for the public safety. The decision process for managing hazardous materials and responsive activities is an exceedingly complex one in which the concept of legal liability should be an incidental rather than a prime component. The goals of prevention and deterrence in the management of risks require a mating of skills of a technological nature with those of the sociologist, the economist, and the legislator, as well as the lawyer and the judge. In the aftermath of disaster such as refinery explosions, the smog incidents in Donora, Pa., and London, or the oil spill along the Santa Barbara coastline, or a nuclear reactor exposion, the goals of rehabilitation, restoration, and reconstruction require a multi-disciplinary effort which must be largely organized in anticipation of the event rather than under post-deprivational crisis conditions. At present, there is no effective agency or organization responsible for planning and training for comprehensive and effective response to major disasters, in spite of the limited and sporadic efforts of the Office of Emergency Preparedness.
APTIC-24760

BOILERS AND THE CLEAN AIR ACTS.

J. Inst. Heating Ventilating Engrs. (London), vol.
38:A24, A29, A30, Oct. 1970. (Also: Oil Gas
Firing, June 1970.)
Geoffrey E. Cox.
Identifiers: *Legislation, *Boilers, Abatement, Planning and zoning, Great britain, Dusts, Fumes, Smokes, Fuels, Stacks, Ringelmann chart.

Legislation of The Clean Air Acts 1956/68 involves the design, installation and usage of boilers, and responsibility rests on the Manufacturer, the Installer, the Retailer of both fuel and appliance, and of course the User. The User is prohibited from emitting dark smoke, and a comparison is provided between the Ringlemann Chart and the Bacherach and Shell smoke test given at the boiler fluehood. New furnaces should be capable of operating continuously without emitting smoke as far as practicable. There are prescribed limits on the user for emission of grit, dust and fumes. However, the MEG and UEG range of solid fuel boilers are exempted on the basis that they fall within the stated category of combustion chamber and stoker design, in that the burning rate is not more than 25 lbs of fuel per sq ft of combustion area per hour and below the maximum input rating of 1 ton per hour. The installer must make notification and have the Local Authority's approval of chimney height. Obligations of the manufacturer, installer, and user are summarized. Smoke control areas will be set up where purchase of prescribed solid fuel as well as appliances are the responsibility of both user and retailer.
APTIC-24828

A SUMMARY OF FEDERAL, STATE AND LOCAL AIR POLLUTION LAWS.

In: The Air Pollution Threat. Technical Paper -2,
7p., Oct. 1969. 19 refs. CFSTI: PB 191382
Personal Author Not Recorded.
Identifiers: *Federal governments, *State governments, *Legislation, *California, Abatement, Grants, Local governments, Clean air act.

The Clean Air Act of 1963, through the Dept. of Health, Education, and Welfare, extended the program of Federal grants to aid local air pollution control programs and permitted Federal assistance in settling inter-community and interstate emission problems. The Federal role was expanded by the Air Quality Act of 1967, which sets up a mechanism for developing control programs on a regional basis establishes standards for motor vehicle control, and extends the grant and assistance program. The California County Air Pollution Districts Act was passed in 1947 to control pollution throughout the state by setting up districts within each county to enforce the State Emission Standards set down in the law. In 1967, the Mulford-Carrell Air Resources Act directed the delineation of air basins and pollution standards for the entire state by the Air Resources Board and permitted the establishment of regional air quality control districts. On a local level, the counties within the Sacramento region except Sacramento County, do not have established ordinances on emissions. Programs of State and Federal financial aid to local control agencies are outlined.
APTIC-24855

PREPARED STATEMENT OF CHARLES C JOHNSON, JR., ADMINISTRATOR, ENVIRONMENTAL HEALTH SERVICE, PUBLIC HEALTH SERVICE, DEPARTMENT OF HEALTH, EDUCATION AND WELFARE.

In: Air Pollution-1970, Part 1. 91st Congress
(Senate), Second Session on S.3229, S.3466,
S.3546, p. 196-203, 1970. (Hearings Before The
Subcommittee on Air and Water Pollution of the
Committee on Public Works, March 16, 17, 18,
1970.)
Charles C. Johnson Jr.
Identifiers: *Control programs, *Federal governments, Abatement, Research programs, Air quality criteria, Local governments, Regional governments, State governments, Senate hearings, Air quality standards.

Progress made by the National Air Pollution Control Administration in implementing provisions of the Clean Air Act is reviewed. The process of planning for regional control of air pollution has been set in motion in areas involving 25 states and the District of Columbia and will soon be extended to the rest of the first 57 areas designated as air quality control regions. For the already designated regions, state governments have begun adopting air quality standards and implementing plans for controlling sulfur oxides and particulate matter, for which the NAPCA has issued air quality

criteria. Forthcoming criteria apply to carbon monoxide, hydrocarbons, and oxidants. In addition, criteria for nitrogen oxides, fluorides, lead, and polynuclear compounds are under development. Expansion of air pollution control activities at state, local, and regional areas has been made possible by the NAPCA's manpower development activities. With respect to air pollution from motor vehicles, NAPCA has taken the significant step of issuing new and more restrictive emission standards. It is also supporting research and development on emission control techniques for the internal combustion engine. Other major NAPCA activities concern control techniques for stationary sources and the establishment of a national health effects surveillance network that will measure health in relation to air pollution.
APTIC-24857

RECOMMENDATIONS AND SUMMARY OF PARKERSBURG, W. VA.-MARIETTA, OHIO, INTERSTATE AIR POLLUTION ABATEMENT CONFERENCE.

In: Air Pollution-1970, Part 4. 91st Congress
(Senate), Second Session on S.3229, S.3466,
S.3546, p. 1262-1271, 1970. (Hearings before the
Subcommittee on Air and Water Pollution of the
Committee on Public Works, March 26, April 1
(Los Angeles), April 17, May 27, 1970.)
Personal Author Not Recorded.
Identifiers: *Area surveys, *Ohio, *West virginia, Abatement, Control programs, Senate hearings, Diurnal, Plant damage, Respiratory diseases, Particulates, Suspended particulates, Open burning, Air quality measurements, Visibility, Chlorine compounds, Sulfur dioxide.

Meteorologic records and data demonstrate that there is a substantial transport of pollutants discharged into the atmosphere of the Parkersburg, West Virginia-Marietta, Ohio area. Average daily concentrations of suspended particulates exceed 150 mg per cu m with maximum daily averages exceeding 500 mg per cu m. Average daily sulfur dioxide concentrations are 0.10 ppm. Chlorine is often present in 70-100 ppm. These excessive levels of air pollution are associated with a high incidence of respiratory diseases, damage to vegetation, reduction of sunlight, and reduced visibility. The air pollution control agencies of the two states should cooperate closely in the development of air quality objectives for the area, air pollution control regulations, and enforcement procedures. For their guidance, recommended maximum emissions are presented for particulate matter from fuel-burning equipment and from industrial processes. Recommendations on sulfur dioxide emissions await the report of the Union Carbide Company, the largest emitter of both sulfur dioxide and particulates, on its contribution to the sulfur dioxide pollution problem. Progress reports on pollution abatement programs should be required of all major industrial sources. It is also imperative that prohibitions against open burning of all wastes be strictly enforced.
APTIC-24858

THE CALIFORNIA TEST. FIGHT AGAINST AIR POLLUTION BY MEANS OF CONTROL MEASURES APPLICABLE TO NEW AUTOMOBILES IN THE U.S.A.

(California-Test. Bekaempfung der
Luftverunreinigung dutch Kontrollmassnahmen
an neuen Motorfahrzeugtypen in den Vereinigten
Staaten von Amerika). Text in German. Neue
Zuercher Zeitung, no. 5168:4-5, Nov. 29, 1966.
Thomas Th. Mueller.
Identifiers: *Emission standards, *United states, *Spark ignition engines, *Carbon monoxide, Federal governments, State governments, Legislation, California, Germany, Engine exhausts, Crankcase emissions, Fuel tank evaporation, Carburetor evaporation losses, Automotive emission control, Hydrocarbons, Nitrogen oxides.

Approximately 10% fuel is in one way or another emitted by the automobile engine into the atmosphere. Of this quantity 65% is emitted by the exhaust, 25% by the crankase, and 10% by the gas tank and the float chamber. The crankase emission can easily be destroyed in the carburetor. The emission of exhaust gases resulting from the incomplete combustion of fuel is due to lack of homogeneity of the combustion mix and to the water-gas reaction. The maximimally permitted total hydrocarbon emission level in the U.S.A. is 275 ppm (calculated as hexane), the carbon monoxide level 1.5 vol% and nitrogen oxides level 350 ppm. The California 7 step test designed to measure automobile engine emission published in the U. S. Federal Register of March 30, 1966 is described. The California and Federal exhaust norms are based on concentrations. Since dilution of exhaust gases reduces only the measured values but not absolute emission, all norms require the correction of measured values to a 15% carbon content. The results achieved in reducing air pollution from automobiles in California are reviewed. All imported European automobiles will have to conform to U. S. automobile exhaust norms.
APTIC-24859

A GUIDE TO THE AIR QUALITY ACT OF 1967.

Law and Contemporary Problems, 33 (2):239-274,
1968. 141 refs.
Robert Martin, and Lloyd Symington.
Identifiers: *Control programs, *Legislation, Abatement, Research programs, Commercial firms, Criteria, Enforcement procedures, Federal governments, State governments, Clean air act, Planning and zoning, Standards, Fuels.

The Air Quality Act of 1967, signed into law on Nov. 21, 1967, is the most important step to date in organizing government's response to the nation's growing air pollution problems. By recognizing health requirements, economic and technological realities, and the necessity of a flexible approach, the Act provides a framework for an active government-industry partnership directed toward achieving the goal of clean air. The Air Quality Act amended the Clean Air Act of 1963 in a number of significant respects. The main purposes of these amendments were: to lead to state control of air pollution problems; to assure that the HEW criteria and recommended control techniques, which are necessary to trigger the state control programs, are relevant and technically valid; to assure adequate outside consultation by HEW in carrying out all of its major responsibilities pertaining to air pollution control; and to authorize HEW to establish standards if a state fails to act or if state action is considered inadequate. The development of state and federal control programs, standards and criteria, air quality control regions, and enforcement procedures is discussed. Emergency abatement measures as provided for by the Act are considered. A section in the new act eliminates the specific references to research relating to sulfur and adds the more general area of fuel research, to determine which fuels are most to blame for air contamination and how to prevent or control such contamination. The act also has provisions on automotive vehicle emissions, but they are not considered here.
APTIC-24930

AIR POLLUTION ABATEMENT PROCEDURES UNDER THE CLEAN AIR ACT.

Arizona Law Rev., 10 (1):30-36, Summer 1968. 8
refs. (Presented at the Federal Bar Association,
Bureau of National Affairs Briefing Conference
on Air and Water Pollution Control, Washington,
D. C., March 15, 1968.)
Sidney Edelman.
Identifiers: *Abatement, *Federal governments, *Legislation, Grants, Plans and programs, Meetings, Questionnaires, Emission standards.

As amended in 1967, the Clean Air Act directs the Secretary of Health, Education, and Welfare to establish a national research and development program for the prevention and control of air pollution from all sources; provides for grants to support state, interstate and local air pollution planning and control programs; authorizes federal standards for the control of emissions from new motor vehicles; and provides for federal abatement action under carefully prescribed conditions. However, the Secretary has no authority to initiate action on intrastate pollution without a request. Preparation and procedure for calling a conference are mentioned. One of the difficult problems facing the federal agency in preparing for a conference is the identification of sources of air pollutants and evaluating their contribution to the air pollution under investigation. While the Clean Air Act does not provide for inspection authority, it does provide a limited authority to require reports. Questionnaire forms are utilized, and the nature of the request and the use of the information are discussed. After the conference, the Secretary may recommend to the appropriate agencies that necessary remedial action be taken to abate the pollution, allowing a specified period, but not less than six months, for such action. Further considerations concerning provisions for abatement are included.
APTIC-24948

INDUSTRY-THE VIEWS OF THE REGULATED.

Arizona Law Rev., 10 (1): 74-80, Summer 1968. 19
refs.
Calvin A. Behle.
Identifiers: *Litigation, *Industrial emission sources, Abatement, Plans and programs, Criteria, Federal governments, Aluminum, Petroleum refining, Mineral processing, Primary metallurgical processing.

Scientific evidence is brining home the fact that perhaps one-fifth or less of the principal atmospheric pollutants in the United States is released from manufacturing plants, including electric power generating complexes. However, industry has shared the irresponsibility of the rest over the decades, and the law books contain many interesting reports of the litigation which hammered out the available legal remedies. In addition to invocation of the law of nuisance, other remedies available and effectively employed were actions sounding in trespass for damage to real property, trespass on the case, and the newer and somewhat more difficult but flexible action of negligence. Among the principal considerations involved in the choice of remedies would be the applicable statute of limitations in the particular forum. Cases are cited which pertain to smelters, oil refineries, aluminum interest, and many other lawsuits arising out of mining and earth processing operations. The National Association of Manufacturers feels that the federal role should emphasize the necessary research and development to prevent and control air pollution, making possible the establishment, scientifically, of criteria to define which levels of pollutants are harmful. Then, the executive branch of the government should have the responsibility of 'leading' rather than 'driving' the states and communities to abate and control air pollution.
APTIC-24949

SUMMARY OF THE AIR QUALITY ACT OF 1967.

Arizona Law Rev., 19 (1): 25-29, Summer 1968. 24
refs. (Presented at the Federal Bar Association,
Bureau of National Affairs Briefing Conference
on Air and Water Pollution Control, Washington,
D. C., March 14, 1968.)
John T. Middleton.
Identifiers: *Abatement, *Federal governments, *Legislation, Grants, Plans and programs, Costs, Air quality criteria, State governments, Planning and zoning, Public information, Automobiles.

The steps by which air pollution control will be effected under the Air Quality Act of 1967 are briefly described and graphically indicated with the aid of a chart. First, the Department of Health, Education, and Welfare was given the responsibility of defining the broad atmospheric areas of

the nation; second, the Act requires the Department to designate specific air quality control regions. At the same time, the Department is required to develop and publish air quality criteria for a pollutant or group of pollutants, together with information on available control techniques applicable to the various sources of that pollutant or group of pollutants. The Act sets up a timetable which states must follow in developing air quality standards and implementation plans for the designated regions. Under the Air Quality Act, the federal funds authorized for research and development are vastly expanded, with a total of $125 million earmarked for this purpose over the next two years. Additional provisions include the awarding of grants to states to assist in developing programs for inspection of motor vehicle control systems, as well as a number of new activities to encourage states to work together in developing air quality standards and implementation plans. For the current fiscal year, $66 millon dollars have been appropriated to the Department of Health, Education, and Welfare for air pollution activities.
APTIC-24950

INDUSTRY, ENVIRONMENT AND ENVIRONMENTAL PROTECTION.

(Industrie, Umwelt und Umweltschutz). Text in German. Wasser Luft Betrieb, 14 (10):416-417, Oct. 1970.
Personal Author Not Recorded.
Identifiers: *Abatement, *Trends, *Germany, *Water pollution, Control programs, Costs, Emission standards, Domestic heating, Sewage treatment, Solid waste disposal, Internal combustion engines.

The probable future trends in water pollution, in atmospheric pollution and in pollution of the environment by solid waste in West Germany over the foreseeable future are outlined; the costs for their control to the public treasury and to industry are estimated; the question as to who should bear the cost of pollution control is discussed; and uniform pollution control standards are postulated to prevent competitive advantages to arise for industries in states with more lenient pollution control legislation. Biological sewage treatment plants and canalization at present are available for less than 50% of the population. It is predicted that the share of pollution from industry will increase in the future because of the expected reduction of pollution from internal combustion engines and from home heating plants and furnaces due to the use of less polluting fuels or gas. The removal or reduction of environmental emissions represent only a secondary solution of the pollution problem. A primary solution lies in the search for manufacturing methods that do not generate pollution in the first place. Public and private funds will have to be chanelled into research for this purpose.
APTIC-25541

STRUCTURE AND WORK OF THE AIR POLLUTION CONTROL ADMINISTRATION IN THE FEDERAL REPUBLIC OF GERMANY-EXPERIENCES, PROBLEMS, INTERNATIONAL COMPARISONS.

Preprint, International Union of Air Pollution Prevention Associations, 17p., 1970. (Presented at the International Clean Air Congress, 2nd, Washington, D. C., Dec. 6-11, 1970, Paper AD-11F.)
Klaus Boisseree.
Identifiers: *Administration, *Control agencies, *Germany, Abatement, Federal governments, Local governments, State governments, Planning and zoning, Regulations, Personnel, Personnel qualifications.

A description of the organization and use of governmental administration in the field of air pollution prevention in the Federal Republic of Germany is presented. State authorities carry out both State and Federal laws. The scope of duties of the authorities includes investigating and surveying air pollution; official inspection of potential pollution sources; requiring plants to meet certain technical improvements in their operation; acting as sponsers and consultants to promote technology; and cooperating in planning and redevelopment projects. The optimum size for the jurisdiction of the Air Pollution Control Authorities is the whole state territory. Within the framework of the state authorities, three levels exist: the Central Authority, which issues general guidelines for the clean air programs; the Regional Authority, which issues licenses to stationary sources; and the Lower Level Authorities, which inspect plants and draft and enforce technical abatement measures. Professional qualifications and training for personnel are described.
APTIC-25551

THE LEGAL BASIS OF AIR POLLUTION CONTROL.

(Die Rechtsgrundlagen fuer the Bekaempfung von Luftverunreinigungen). Text in German. Z. Praeventivmed., vol. 15:231-234, 1970.
Dieter Hoegger.
Identifiers: *Abatement, *Legislation, Federal governments, Regulations, Europe, Germany, Domestic heating, Internal combustion engines.

Aside from the introduction and application of various technical devices, installations, and process modifications, air pollution control also requires the passage of an appropriate air pollution control law which would impose legal obligations on all concerned. The currently existing legal measures are inadequate and sometimes contradictory; they are dispersed in a number of different laws which makes their enforcement difficult. Thus a law exists which prohibits the planting of crops within 150 m from turnpikes which implies that a health hazard exists in these zones. But no law exists prohibiting dwellings to be erected in these zones. While regulations for permissible emission levels by internal combustion engines are contained in article 8 of the traffic law, regulations governing air pollution from industrial enterprises are contained in article 6 of the work law. No federal law exists at present stipulating permissible pollution levels from domestic heating plants and it is left to individual boroughs to promulgate respective ordinances if they deem it necessary. To remedy the chaotic legal situation, the West German Federal Parliament has instructed a special commission to draw up proposals for a unified air pollution control law.
APTIC-25555

AIR POLLUTION CONTROL. ACTIVE RESEARCH GRANTS FOR FISCAL YEAR 1969.

NAPCA Pub. APTD 69-21, 43p., Oct. 1969. NTIS: PB 194806
Personal Author Not Recorded.
Identifiers: *Grants, *Control agencies, *Federal governments, Abatement, Research programs, Socio-economic factors, Plant damage, Epidemiology, Respiratory functions, Health impairment, Industrial emission sources, Measurement methods, Control methods, Meteorology.

During fiscal year 1969, grants were awarded by the National Air Pollution Control Administration in eight major areas: human health effects, agricultural effects, socio-economic and political studies, analyses and physio-chemical investigations, development of analytic methods and equipment, meteorology, air pollution source control, and communications. The grant number, name, institution, and project title, period of project, and amount of money are listed. Air pollution effects on human health include epidemiological and statistical studies, broncho-pulmonary physiology and pathology, broncho-pulmonary diseases, aeroallergens, and the physiologic effects of specific air pollutants--sulfur oxides, nitrogen oxides, lead, ions, and others.
APTIC-25583

CONTROL OF AUTOMOBILE EMISSIONS-CALIFORNIA EXPERIENCE AND THE FEDERAL LEGISLATION.

Law and Contemporary Problems, 33 (2):297-314, Spring, 1968. 71 refs.
Harold W. Kennedy, and Martin E. Weekes.
Identifiers: *Clean air act, *California, *Automotive emission control, Abatement, Federal governments, State governments, Legislation, Regulations, Emission standards, United states, Automotive emissions, Smog, Automobiles.

The experience of the State of California in controlling automobile emissions and the impact of Federal legislation on this problem are discussed. The history of state legislation enacted in California is traced, and the provisions of that legislation are discussed. Various court decisions which affected the control of automobile emissions are analyzed. In 1967 the California Legislation adopted the Mulford-Carrell Air Resources Act, which incorporated many of the earlier legal provisions, in addition to some new ones. The legal foundation for regulating air contamination is discussed. The Air Quality Act of 1967 is almost a complete recodification of the Clean Air Act except that the 1967 act specifically sets forth the intention of the Congress to preempt the field of motor vehicle pollution control. This preemption is considered from a legal viewpoint. A comparison of emission standards for California and Federal requirements indicates that at the present time, the standards are quite similar, but proposed California standards are more stringent than Federal ones. The Federal law has waived its preemption of these standards for 1969 and 1970 model-year cars.
APTIC-25591

THE CONTROL OF ORGANIC SOLVENTS.

For primary bibliographic entry see Field 01.
APTIC-25592

ROLE OF THE FEDERAL GOVERNMENT IN AIR POLLUTION CONTROL.

Arizona Law Rev., 10 (1):17-24, Summer 1968. 15 refs.
Edmund S. Muskie.
Identifiers: *Abatement, *Federal governments, *Clean air act, Grants, Plans and programs, Hearings, Solid waste disposal, Water pollution, Automobiles.

The philosophy of the Clean Air Act of 1963 was to encourage state, regional and local programs to control and abate pollution, while spelling out the authority of the national government to step into interstate situations with effective enforcement authority. However it soon became apparent that a program patterned on the existing water pollution control act would not be sufficient for the unique problems of air pollution. One of the best examples of the differences between air and water pollution control involved the problem of the automobile, and the potential confusion which could be created by the establishment of up to fifty different standards by the fifty different states. The 1965 Act also provided for federal support for research and development of improved techniques of solid waste disposal, and thus it cut across environmental contamination lines, involving damage to soil and water as well as to the air. Disagreements concerning the 1967 statute centered on the question of whether the national program should be based on national emission standards or a national ambient air quality program. The hearings are mentioned, as well as the arguments and considerations involved. Basic to any understanding of what the Congress has done in the Air Quality Act is comprehension of the concept of air quality criteria and standards. Steps of the Air Quality act of 1967 are enumerated. The federal role throughout is that of setting national goals, providing the necessary scientific, technical, and financial support to launch an effective air quality enhancement program, providing the framework for regional institutions to plan for and

implement such programs, and having available the necessary enforcement authority in those cases where jurisdictional impasses or the breakdown of local authority makes it impossible to protect the health or welfare of communities and states.
APTIC-25595

THE ROLE OF PRIVATE NUISANCE LAW IN THE CONTROL OF AIR POLLUTION.

Airzona Law Rev., 10 (1):107-119, Summer 1968. 182 refs.
William C. Porter.
Identifiers: *Abatement, *Legislation, *Litigation, Legal aspects.

Public air pollution law has slowly evolved toward modern air pollution statutory regulation. By the middle of the twentieth century it became apparent that it was the cumulative effect of the emissions of many polluters and not the emissions of any one car or factory that was the real problem; yet, traditional public nuisance law had required that injury be clearly attributable to specific defendants. Private nuisance law developed quite differently, and an action to abate a private nuisance is in no way precluded because of the overlapping applicability of an air pollution statute. Conceptual problems which have confused private nuisance law are mentioned. In the middle of the 19th century, a new and unfortunate distinction was made: development of the law of negligence caused courts to attempt to distinguish between nuisances that required proof of negligence and those that did not. The American Law Institute recognized the tangle of nuisance law and attempted to clarify it in its 1939 Restatement of Torts. This defined private nuisance in terms of intent and reasonableness, and relegated both negligence and the ultra-hazardous activity doctrine to a limited role. Under both the Restatement and absolute approaches to private nuisance law, individual civil suits can be useful in the battle against air pollution. However, the interference must be a substantial and continuing one as seen by or affecting a person of 'ordinary sensibilities.' Nuisance actions may also be subject to several defenses. The determination of temporary or permanent nuisance determines whether successive suits for damages may be brought. There is also a possibility of using common law or statutory trespass law, although the interference must be such as to interfere with the possession of the property and not merely with its use and enjoyment. Numerous cases are cited.
APTIC-25596

THE MISDEMEANOR APPROACH TO POLLUTION CONTROL.

Arizona Law Rev., 10 (1):90-96, Summer 1968. 53 refs.
David D. Mix.
Identifiers: *Abatement, *Enforcement procedures, *Litigation, *Los angeles, Costs, Legislation.

It is not unusual for laws to provide administrative procedures for the abatement of air pollution, and the criminal penalty is the most familiar and common technique for securing compliance with the law. Since 1947, local air pollution control districts in California have employed three primary methods of enforcement: the permit system, the injunction, and the criminal penalty. The permit system includes the power to revoke permits, after an administrative hearing. This system, violation of which is a misdemeanor under the statutes governing the Los Angeles County Air Pollution Control District, has been very effective, and over the past twenty years has resulted in an expenditure of over $130,000,000 for air pollution control equipment. Los Angeles experience has shown that the remedy of injunction is valuable, but only as a supplemental remedy. Some problems in the criminal penalty approach are cited, such that it can result in a refusal of an operator to furnish information and analyses to a control officer upon the basis of potential self-incrimination. Several cases are included to illustrate the point that the misdemeanor approach can be effective in cases where a hearing board or other judicial or quasi-judicial body applies traditional principles of equity. However, statutes and ordinances making it a crime to refuse to allow an inspector to enter for a mere inspection are effectively nullified by these decisions.
APTIC-25597

AIR POLLUTION.

In: Environmental Quality, First Annual Report. Chapt. 4, p. 61-91, Aug. 1970.
Personal Author Not Recorded.
Identifiers: *Control programs, *Federal governments, *Standards, Air quality measurement programs, Proposals, Research programs, Control agencies, Costs, Economic losses, Enforcement procedures, Local governments, State governments, Legislation, Clean air act, Planning and zoning, Air quality standards, Emission standards, Plant damage, Health impairment, Materials deterioration, Pollutants, Automotive emissions, Oxidants, Particulates, Sources, Transportation, Hydrocarbons, Carbon monoxide, Nitrogen oxides, Sulfur oxides.

A general survey of the problem of air pollution is given with respect to the major pollutants and their sources; effects on human health, vegetation, materials, climate, and visibility; its costs in damages and control, and Federal legislative and administrative history. The abatement program for control of automotive pollution, under the impetus of Federal standards, is reviewed, as well as the prospects for controlling sulfur oxides and the role of State and local governments in the control effort. It is concluded that the air pollution effort is not as advanced as water pollution for stationary sources for three major reasons: there is no available technology for a number of air pollutants; the entrance of State and Federal agencies in the air pollution field is very recent and hence their experience and effectiveness less; and the Air Quality Act of 1967 is no longer adequate to deal with the problems. The attack on pollution from automobiles has made somewhat better progress. Monitoring programs for the most part are seriously inadequate. Fifteen recommendations are made, including enactment of the President's legislative program for setting national air quality and emission standards and enforcement procedures, a greatly expanded research and development effort on all fronts, improved monitoring programs, improvement in State and local control agencies, and use of land use planning and control to minimize air pollution.
APTIC-25610

THE CALAVERAS CEMENT CO. DUST SUIT.

Mining Engineering, 3 (6): 534-536, June 1951.
(Presented at the American Institute of Mining, Metallurgical and Petroleum Engineers Meeting, Los Angeles, Calif., Oct. 1949 and New York, Feb. 1950, Paper TP 3047H.)
William Wallace Mein Jr.
Identifiers: *Economic losses, *Litigation, *Cements, Cattle, Crops, Plant damage, Toxicity, Fluorosis, Farms, Dusts, Mineral processing, Fluorine.

An account is given of the background, testimony, and outcome of a 1949 trial resulting from a suit by five landowners, all cattle ranchers, whose properties are located in the vicinity of a cement plant. The plaintiffs sued for dust damages of $120,338 and for an injunction preventing the company from casting dust on their properties in injurious quantities. Testimony for the plaintiffs was designed to establish that the flue dust had damaged the land and forage and had caused fluorine poisoining to the cattle, both results causing substantial loss of profits. Defense testimony sought to establish that the damage had been enormously exaggerated and should be limited to the much lower loss of rental values, and that the claim of fluorine poisoning was spurious. A jury verdict awarded the ranchers $7508 in damages and the court issued an injunction following the lines of a company proposal requiring a minimum stack dust recovery of 87%. The plaintiffs subsequently filed an appeal, contending that their proposed version of the injunction should be the one adopted by the court; this appeal was still pending at time of writing.
APTIC-25642

AIR POLLUTION, PRE-EMPTION, LOCAL PROBLEMS AND THE CONSTITUTION–SOME PIGEONHOLES AND HATRACKS.

Arizona Law Rev., 10 (1):97-106, Summer 1968. 66 refs.
Peter J. Rathwell.
Identifiers: *Abatement, *Federal governments, *State governments, *Legislation, Local governments, Legal aspects, Litigation.

The intent of Congress in the Air Quality Act of 1967 is that the states shall be primarily responsible for curbing the stationary sources of air pollution through the setting of local standards, while the federal government has sole responsibility for setting the standards to control mobile sources passing in interstate commerce. Generally, when Congress intends to preempt the field and state statutes are in conflict with the national legislation, the state enactment must necessarily succumb to the supremacy clause of the United States Constitution. Cases are cited pertaining to the question of whether there are any circustances under which local concern can override a Congressional decision to occupy the field. The power of a regional governmental unit to protect its own public health when national protection proves inadequate is a value to be balanced against the power of Congress to regulate the interstate transportation and sale of goods under the commerce power. It is asked if the concept of equal protection implies a right to an appropriate, though different, governmental response where the problem faced differs in magnitude. Considerations of equal protection are discussed, as well as intent of the ninth amendment.
APTIC-25671

PROPOSED IMPLEMENTATION PLAN FOR THE CONTROL OF PARTICULATES AND SULFUR OXIDES FOR THE STATE OF OHIO PORTION OF THE METROPOLITAN CINCINNATI INTERSTATE AIR QUALITY CONTROL REGION.

NAPCA Contract CPA 70-29, 238p., Sept. 1970.
NTIS: PB 195758
Personal Author Not Recorded.
Identifiers: *Control programs, *Proposals, *Regulations, *Metropolitan cincinnati interstate air quality control region (mciaqcr), Budgets, Air quality measurement programs, Costs, State governments, Legal aspects, Legislation, Planning and zoning, Emission standards, Annual, Diurnal, Seasonal, Cincinnati, Urban areas, Particulates, Suspended particulates, Electric power production, Incineration, Open burning, Air quality measurements, Dust fall, Emission inventories, Soiling index, Diffusion models, Point sources, Winds, Sulfur dioxide.

The Metropolitan Cincinnati Interstate Air Quality Control Region (MCIAQCR), designated in May 1969, comproses approximately 3000 square miles of land area located in the extreme southwestern portion of Ohio and the adjacent states of Indiana and Kentucky. The proposed regional control strategy for particulates consists of emission standards covering three general categories of emissions: industrial process, fuel combustion, and solid waste disposal. The proposed control strategy for sulfur oxides consists of those emission standards already in effect in Cincinnati: the emission categories considered by these standards are industrial process and fuel combustion. When adopted and enforced, these strategies should lead to acceptable levels of both suspended particulate

and sulfur dioxide as defined by regional Air Quality Standards. Legally enforceable control regulations based on the emission standards are presented. In Ohio, the regulations will be implemented primarily through a permit and source surveillance system. Legal and administrative deficiencies hindering enforcement of the control plan in Ohio are pointed out, and remedial measures suggested. Also reviewed are the projected regional air quality monitoring network and procedures to be used to control sources during emergency episodes.
APTIC-25688

THE HUNDRED MEASURES.

(Les cent mesures). Text in French. Pollut. Atmos. (Paris), 8 (47):151-162, July-Sept., 1970.
Personal Author Not Recorded.
Identifiers: *Plans and programs, *Federal governments, *Regulations, *France, Control agencies, Education, Local governments, Regional governments, Legislation, Planning and zoning, Public information, Research institutes, Non-urban areas, Urban areas.

The so-called 'Hundred Measures' related to environmental preservation were officially presented by the French Prime Minister at the Cabinet Meeting of June 10, 1970, simultaneously with the announcement that a National Committee on Environment had been created. The actions taken are divided into 12 categories, designated as follows: direct actions against pollution (legislative, regulatory, organizational, and experimental, actions 1-26), urban areas (actions 27-34), rural areas (actions 35-45), management of land resources and natural cycles (46-54), forest (55-57), protection of fauna and flora (58-61), park lands (62-66), support of environmental studies and research (67-74), zoning and land use policies (75-79), educational programs (80-91), dissemination of information (92-95), modifications of administrative structure (96-99), regional and local action (100). Among the specific measures against air pollution, new zones of special protection, analogous to those already existing for the Department of Paris, are to be created in accordance with air pollution legislation of August 2, 1961, and an administrative decree of September 17, 1963.
APTIC-25731

AIR POLLUTION AND GOVERNMENT STRUCTURE.

Ariz. Law Rev., 10 (1): 48-67, Summer 1968. 42 refs.
Joseph D. Coons.
Identifiers: *Abatement, *Local governments, Air resource management, Control agencies, Education, Enforcement procedures, Legal aspects.

The diversity of air pollution problems and solutions in various communities is such that no generally applicable national formula is appropriate for detailed program decisions. While some of the physical facts have general application, many of them pertain only to a given locality, and must be developed in that locality. The weighing of relative values, based on physical information, is also unique to the community. However, the 'community' for air pollution problems does not usually correspond to boundaries of existing jurisdictions. The lack of an air pollution program in many communities may be due to the absence of effects, a lack of information, or to the existence of jurisdictional problems. Local, state, and federal action should be directed toward resolving deficiencies in physical understanding and public education, and jurisdictional alignment. These must be solved before appropriate control measures can be effectively pursued. If local governments are to exercise proper judgment and take proper action, their restructuring, with regard to both area and method, may be required.
APTIC-25763

ADMINISTRATIVE NEEDS AND PATTERNS OF AIR-POLLUTION CONTROL.

In: Problems and Control of Air Pollution. F. S. Mallette (ed.), New York, Reinhold, 1955, Chapt. 4, p. 32-41.
Arthur C. Stern.
Identifiers: *Administration, *Local governments, *Opinion surveys, *New york state, Advisory services, Federal governments, State governments, Questionnaires, Non-urban areas, Urban areas.

Data are summarized in some detail from a 1954 mail survey of local officials conducted for New York State by the Division of Industrial Hygiene of the Labor Department. This survey is the closest approach to date by any state to an organized assessment of grass roots as well as metropolitan pollution problems, in order to form an integrated evaluation. Among the many problems indicated by analysis of the results were location of polluters outside local jurisdictional limits, absence of local control ordinances, and lack of trained personnel. Although New York has two state-level departments (Health and Labor) which can provide assistance to local communities, some states have none, and in these cases local problems should be directed by the state to appropriate Federal agencies. Multi-county or regional administrative units are being developed as best fitting the needs of metropolitan areas, but they take many years to activate and again Federal agencies should fill the interim gap for facilities and personnel, when requested. Problems arise where the state has not indicated which state or munciipal agency its Federal counterpart must deal with, but these should be resolved by consultation and no attempt should be made to use Federal funds or prestige to establish competing agencies to any state or municipal body with a successful control or research program.
APTIC-25774

THE GROWTH OF PUBLIC OPINION.

For primary bibliographic entry see Field 13.
APTIC-25776

THE RELATIONSHIP OF TECHNOLOGY ASSESSMENT TO ENVIRONMENTAL MANAGEMENT.

George Washington Univ., Washington, D. C., Program of Policy Studies in Science and Technology, Staff Discussion Paper 206, 34p., Oct. 1969. 43 refs. NTIS: PB 192554
Louis Mayo.
Identifiers: *Federal governments, *Technology assessment, Plans and programs, Control programs, Proposals, Control agencies.

Because of the detrimental impact of many technical applications, it is advisable to improve our capability to identify the full range of impacts (direct and derivative, immediate, intermediate, and long-term) and to evaluate their social desirability or undesirability. Although this concept of 'technology assessment' is similar to concepts such as the systems approach, cybernetics, and social indicators, it differs from them in its emphasis on social impacts and on standards and criteria by which these impacts could be measured. In view of the role of the Federal government in initiating and supporting technical development, it is evident that a strengthened technology assessment function must work from existing conditions, constraints, and institutions. It can be hoped, therefore, that Congress will take a more positive attitude toward the potential benefits of a revised assessment structure. Two approaches could be taken to this structure: a total impact approach, which assesses each application for all significant social impacts, and a social problem approach, which utilizes special purpose or total impact assessment relative to such a problem. If a technology is being considered as a means of solving a problem (e.g., reduction of air pollution by electric-powered cars, then a total impact assessment would be advisable. It and when Congress should elect total impact assessments, logical foci for these assessments will be those agencies and programs having primary authority over relevant technological applications.
APTIC-25782

CONTROL OF SPECIAL INDUSTRIAL EMISSIONS IN BRITAIN.

Preprint, International Union of Air Pollution Prevention Associations, 18p., 1970. (Presented at the International Clean Air Congress, 2nd, Washington, D. C., Dec. 6-11, 1970, Paper AD-11A.)
F. E. Ireland.
Identifiers: *Legislation, *Great britain, *Industrial emission sources, Abatement, Control programs, Control agencies, Governments, Federal governments, Local governments, Area emission allocations, Ireland, Smokes, Stacks.

In Britain, each of the 4 countries of England, Northern Ireland, Scotland and Wales has its own law making and administrative machinery for air pollution control. In practice, they conform closely with each other. Emissions to air from industry are controlled normally by the nuisance provisions of the Public Health Act 1936, by the Clean Air Acts 1956 and 1968, and by the Alkali and C Works Regulation Act. 1906. Common Law can also be invoked if members of the public are dissatisfied with the operation of the controlling Acts and wish themselves to seek redress in the Courts. The Public Health Act, recently strengthened by the Public Health (Recurring Nuisances) Act 1969, and the Clean Air Acts are administered by local authorities. The first permits action to be taken when nuisance has been caused to the public and the second gives powers to control emissions of smoke grit and dust from the combustion of fuel, to control chimney heights, and to set up smoke control areas. The Alkali Act is administered by an inspectorate of the central government; while Northern Ireland and Scotland operate independently, England and Wales share a common inspectorate. The operation of the Alkali Act in England and Wales is described; it applies similarly to the other 2 countries. Author introduction modified)
APTIC-25879

THE AIR POLLUTION RESEARCH PROGRAM OF THE COORDINATING RESEARCH COUNCIL.

Preprint, Public Health Service, Durham, N. C., National Air Pollution Control Administration, Chrysler Corp., Detroit, Mich., and Phillips Petroleum Co., Bartlesville, Okla., 14p., 1969 (*).
D. S. Barth, C. M. Heinen, and L. A. McReynolds.
Identifiers: *Research programs, *Research institutes, *Automotive emissions, Abatement, Advisory services, Technical societies, Vehicles.

The Coordinating Research Council for automobile and petroleum industries has for many years contributed to technological advances that have helped to reduce objectionable atmospheric emissions from vehicles. This activity was greatly expanded and emphasized in 1967 when the Air Pollution Research Advisory Committee (APRAC) was added to the CRC organizational structure. The main purpose of the APRAC program is to develop basic information on the nature and effects of vehicle air pollution -- not to develop automotive equipment or petroleum products. The results of these studies are expected to provide technical information needed by industry to further reduce emissions and by Government for criteria and control technique documentation. The APRAC research projects are divided into three principal types: engineering, atmospheric, and medical. Specific examples of each are noted.
APTIC-25965

PROPOSED IMPLEMENTATION PLAN FOR THE CONTROL OF PARTICULATES AND SULFUR OXIDES FOR THE STATE OF INDIANA PORTION OF THE METRPOLITAN CINCIN-

NATI INTERSTATE AIR QUALITY CONTROL REGION.

NAPCA Contract CPA 70-29, SN 14838.000,
220p., Sept. 1970. NTIS: PB 195759
Personal Author Not Recorded.
Identifiers: *Plans and programs, *Emission standards, *Metropolitan cincinnati interstate air quality control region, Administration, Alerts, Control agencies, Planning and zoning, Regulations, Indiana, Kentucky, Cincinnati, Industrial areas, Particulates, Fuels, Industrial emission sources, Solid waste disposal, Sulfur oxides control.

The Metropolitan Cincinnati Interstate Air Quality Control Region (MCIAQCR), designated in May 1969, comprises approximately 3000 square miles of land area located in the extreme southwestern portion of Ohio and the adjacent states of Indiana and Kentucky. There is a total of nine counties in the MCIAQCR, which is primarily an industrial area. The proposed particulate control strategy for the MCIAQCR consists of emission standards covering three general categories of emissions sources: industrial process emissions, fuel combustion emissions, and solid waste disposal. The proposed region sulfur oxides control strategy consists of two emission standards on which regulations already in effect in Cincinnati are based: industrial process emissions and fuel combustion emissions. Implementation of the control regulations logically divides into two separate tasks. First, the new regulations must be officially adopted by the responsible state agency. Second, field enforcement and control of pollution sources affected by the regulations must be carried out. This report discusses the implementation plan with respect to legal deficiencies and remedies of various aspects of pollution control as they relate to the state of Indiana. Also noted is a plan designed for the emergency control of particulates and sulfur oxides in Indiana during episode periods when dilution is not adequate to prevent high ground-level concentrations of the pollutants.
APTIC-25998

RESEARCH ON ODOR CONTROL IN THE U.S.A. (A CHAPTER OF RENDERING PLANTS IN WEST COAST).

(Amerika ni okeru akushu no genjo to taisaku
(taiheiyogan toshio kaseijo hen). Text in Japanese.
Akushu No Kenkyu (Odor Research J. Japan), 1
(3):10-20, Oct. 1970. 5 refs.
Y. Shigeta.
Identifiers: *Codes, *Los angeles, *Food and feed operations, *Odor counteraction, Local governments, Japan.

Rule 64 of the Los Angeles Air Pollution code is explained. The rule pertains to odors and applies, among others, to companies such as those making fish meal from offal and bones of tuna, those treating animal bones and carcasses, and those producing feather meal from poultry feathers. Existing plants are required to use dry rendering, (indirect heating of the cooker and dryer), to suppress generation of odors. For the elimination of odors, steam in the gas exhausted from the cooker and dryer must be thoroughly eliminated by combustion of 648 C. Fish meal factories are permitted to add chlorine to the washing water. New rendering plants can use no heating process other than the cooker and must limit their use of the dryer. To encourage the adopting of modern processes and control technology, new plants are required to process 500 tons/day to 2000 tons/day. By reducing the maintenance cost of odor-control equipment, these plants should yield higher profits. It is hoped that 99.9-99.99% odor control can be achieved.
APTIC-26057

CONSIDERATIONS ON IMPROVING THE ENVIRONMENTAL PROTECTION.

(Ueberlegungen zur Verbesserung des
Umweltschutzes). Text in German. Wasser Luft
Betrieb, 14 (11):460-462, Nov. 1970.
Willi Gaessler.
Identifiers: *Abatement, *Hearings, *Germany, Proposals, Costs, City governments, Federal governments, Local governments, State governments, Legislation, Regulations, Permits, Public information.

Hearings were held by the Commission for Environmental Problems of the Federal Parliament in Bonn which were concerned with the improvement of environmental protection. Proposals resulting from the hearings included the introduction of temporary approvals in cases where for technical reasons compliance with existing ordinances required time, a proposal to clearly define the concept of public interest, a proposal to coordinate national environmental legislation with that of neighboring European countries, and a proposal to reexamine the competence of various official bodies for environmental questions. Other proposals serving the same purpose would obligate the government to make public information concerning the environment and the costs of environmental protection and to coordinate local, state, and federal initiatives in the field of environmental control and protection.
APTIC-26061

CONGRESS MAKES FURTHER PROGRESS ON ANTIPOLLUTION LEGISLATION.

Environ. Sci. Technol., 5 (1):26-28, Jan. 1971.
Personal Author Not Recorded.
Identifiers: *Abatement federal governments, *Legislation, Abatement, Federal governments, Engine exhausts, Pesticides, Solid waste disposal, Automobiles, Water pollution.

The second session of the 91st Congress will be remembered for its legislation on three environmental fronts: air pollution, water pollution, and solid wastes management. The Resource Recovery Act of 1970 includes funds for the construction of improved solid waste disposal facilities, including innovative facilities, and demonstration of areawise resource recovery systems. The Water Quality Improvement Act of 1970 provides tighter controls on oil and vessel discharges and sets the stage for control of hazardous materials and pesticides in the water environment. The Act authorizes the federal government to take immediate cleanup action in the navigable waters of the U. S. and the Secretary of the Interior to set performance standards for sanitation devices on all vessels. The National Air Quality Standards Act of 1970 contains more deadlines than any other legislation and introduces new concepts in air pollution. Among the deadlines is the 1975 deadline for 90% control of automobile exhaust emissions. Typical of the new concepts are national ambient air quality standards, standards of performance for industrial plants, and certificate of performance. Other antipollution efforts of the 91st Congress included The Environmental Education Act, approval of the reorganization which established the Environmental Protection Agency, and increased appropriations for environmental programs of federal agencies.
APTIC-26068

EUROPEAN LEGISLATION ON POLLUTION AND WASTE DISPOSAL.

Paint Mfr., 40 (11):35-37, Nov. 1970. 1 ref.
William E. G. Moffat.
Identifiers: *Abatement, *Legislation, *Europe, Automotive emissions, Solid waste disposal, Water pollution, Vehicles, Paint manufacturing, Sulfur dioxide.

European legislation and practice on water and air pollution and waste disposal are surveyed. The effects on the paint industry are highlighted. Water pollution control legislation is mentioned for Austria, Belgium, France, the Netherlands, Sweden, Switzerland, and the United Kingdom. Three classes of water are defined in Belgium, and Class 1 which pertains to drinking water has very strict standards of temperature, pH, solid content, and oxygen content. The other two classes which pertain to fishing waters and industrial water have wider limits. Control of air pollution throughout Europe is confined at present chiefly to limiting sulfur dioxide and exhaust fumes from motor cars. Regulations regarding air pollution from paint manufacturing are mentioned in particular for West Germany. Solid waste from the paint industry includes such materials as paper, packaging materials, processing, and cleaning residues.
APTIC-26070

AIR POLLUTION IN THE UNITED STATES.

(Amerika no taiki osen meguri). Text in Japanese.
Sangyo Kogai (Ind. Public Nuisance), 3 (10):1-7,
Oct. 1967.
Motoji Terabe.
Identifiers: *Abatement, *Control agencies, *Technical societies, Administration, Federal governments, Meetings, Japan, Chicago, New york city, United states, Urban areas.

The Air Pollution Control Association Meeting held in Cleveland, Ohio, The National Air Pollution Control Administration, and the Robert A. Taft Research Center in Cincinnati are discussed. The last two items are presented particularly with reference to organization. New York and Chicago are compared in terms of air pollution and abatement.
APTIC-26090

REQUESTS AND OPINIONS CONCERNING THE ADMINISTRATION OF THE ENVIRONMENTAL STANDARD FOR SULFUR OXIDES.

(Iwosankabutsu no kankyokijun no unyo ni tsuite
no yoboiken). Text in Japanese. (Statement by the
Japan Assoc. of Chemical Industries), 8p., May
24, 1969.
S. Nomura, and J. Kageyama.
Identifiers: *Administration, *Air qaty standard,ulfur xides, Abatement, Commercial firms, Air quality standards, Japan, Sulfur oxides.

The new environmental standards for sulfur oxides are considered to be too strict compared even to the standards existent in New York and New York City, and are extremely difficult to follow. Requests are made to the Government in terms of enforcing the standards. The Government should place top priority on the reduction of sulfur and give it strong monetary and fiscal assistance. For example, the development of low-sulfur oil, natural gas, and new desulfurization techniques are the main criteria. In drawing up public nuisance control policies at the local and regional level, committees including the representatives from the industries should be formed in order to contribute to the formulation of reasonable policies. The environmental standard and the intermediate target values are considered to be administrative in nature, and therefore should be flexible in their enforcement. When local and regional public bodies are enforcing the control measures, there should be some type of supervision in order to prevent one-sidedness. Acquisition and equipment of new industrial lands should be promoted intensively. Future control measures should be formulated strictly based on scientific investigations instead of mere assumptions.
APTIC-26111

REPORT ON THE STATE OF AIR POLLUTION IN SWITZERLAND.

(Rapport sur la situation relative a la pollution de
l'air en Suisse). Text in French. Preprint,
International Union of Air Pollution Prevention
Associations, 3p., 1970. (Presented at the
International Clean Air Congress, 2nd,
Washington, D. C., Dec. 6-11, 1970. Paper P 1-H.)
Walter Hess.
Identifiers: *Control programs, *Advisory services, *Federal governments, *Switzerland, Decisions, Citizens groups, Technical societies, Europe, Fuel oils, Sulfur oxides control.

At the request of Parliament, the Federal Commission on Atmospheric Hygiene submitted a state-

ment on air pollution in Switzerland on June 20, 1961. On January 19, 1962 the Federal Council made the decision to institute a 'Federal Commission on Atmospheric Hygiene' to serve in an advisory capacity to the Department of the Interior. The task of the commission was envisioned as that of observing the relationship of pollution to pollution sources, the effects of pollution on humans, animals, plants and materials, and antipollution devices and their effectiveness. An additional responsibility was to work for uniformity of definitions, methods, and measuring instruments, coordinating measurements and research products in all of Switzerland. Directives on sulfur dioxide control were issued January 24, 1966. A statement of directives on the control of fuel oil heating was issued in January 1969. A brief description is given of the Swiss Sanitary Engineering Association, founded 1917 at Lausanne, three of whose members are delegates to the Federal Commission on Atmospheric Hygiene. One of the aims of this association is to study the theoretical and practical problems related to air pollution. Its present membership of 350 includes representatives of federal, cantonal, and communal agencies, organizations of engineers and architects, and other interested corporations. It publishes an official organ monthly.
APTIC-26135

URBAN PLANNING ASPECTS OF AIR POLLUTION ABATEMENT.

In: Project Clean Air. California Univ., Berkeley
Task Force No. 3, Section 7, 17p., Sept. 1, 1970. 46 refs.
Leland S. Burns.
Identifiers: *Abatement, *Planning and zoning, *Urban areas, Plans and programs, Air resource management, Chicago, Electric power production, Domestic heating, Solid waste disposal, Transportation, Mathematical modeling, Winds, Density.

People from all parts of the urban scene who are concerned with the increased problems of coordination have been increasingly looking to the planners for the abatement of many problems, including air pollution. Regional applications of site selection, wind effects, and air flow patterns have been considered in the architectural and planning processes. Environmental planners are considering various density levels for an urban area and what these levels imply about pollution. The most developed are most documented air resource management program exists in the Chicago metropolitan area, while the Northeastern Illinois Planning Commission has listed the sources of pollution as space heating, power generation, waste disposal, industrial processing, and transportation. Air zoning is the main toll of the Chicago program. Recommendations for physical planning research include regional modeling which would be both a monitoring and evaluative device; indicators; air basin capacity; effect of city size and population density; and the habitat. Proposals for policy planning research include the search for effective institutional frameworks, monitoring and control functions, jurisdiction, levels of acdeptable air pollution, and points of intervention.
APTIC-26157

FOREIGN PROFILES IN AIR POLLUTION CONTROL ACTIVITIES: SPECIAL SOURCES OF INFORMATION.

Preprint, International Union of Air Pollution
Prevention Associations, 9p., 1970. (Presented at
the International Clean Air Congress, 2nd,
Washington, D. C., Dec. 6-11, 1970.)
H. J. Hall, H. I. Fuller, and A. C. Stern.
Identifiers: *Control agencies, *Asia, *Europe, Survey methods, Commercial firms, Federal governments, Local governments, Regional governments, Universities.

A guide being prepared for the National Air Pollution Control Committee will identify and describe organizations of all types outside the United States that are active in the field of air pollution control. Initial data have been collected on 1200 organizations in 11 European countries, the USSR, Japan, and international bodies. The countries covered and the number of organizations in each are listed. A comparison of the organizations by category shows an emphasis on central government activities in Belgium, The Netherlands, Norway, and Sweden. There are relativley more national quasi-government organizations in Austria, France, Great Britain, Italy, and Switzerland and more regional governments in Germany, Japan, and the USSR. Professional and business associations stand out in Germany, France, Denmark, and Sweden and individual business organizations in Great Britain and The Netherlands. Academic activity is strong in the larger countries and also in Austria. An interview procedure is outlined that should make it possible to get a representative picture of the pollution problem in most foreign countries with a half-day or one-day visit to four or five key men in each organization.
APTIC-26168

DEFICIENCIES IN THE AIR QUALITY ACT OF 1967.

Law Contemp. Probl., 33 (2):275-296, Spring 1968.
42 refs.
John E. O'Fallon.
Identifiers: *Abatement, *Legislation, *Standards, Air quality standards, Emission standards.

The Air Quality Act of 1967 is not the strong decisive instrument needed to bring about an immediate, significant reduction in air-pollution levels. The Act is deficient because it puts priority on the adoption of ambient air standards, and only provides for a study of the necessity for national emission standards for stationary sources of pollution. National industrial emission standards should precede ambient air standards as a logical and necessary prerequisite to their attainment, and present technology should be forced into application by imposing emission controls on industry. The Act is also flawed by its attempts to force states to assume greater responsibility in pollution abatement. It does not properly recognize and support the activities of local pollution control agencies which have been, to date, the best equipped and most effective in abating pollution.
APTIC-26196

LEGISLATING FOR AIR QUALITY MANAGEMENT: REDUCING THEORY TO PRACTICE.

Law Contemp. Probl., 33 (2):369-398, Spring 1968.
71 refs.
George Hagevik.
Identifiers: *Abatement, *Economic losses, *Legislation, Costs, Fees, State governments.

The Air Quality Act of 1967 assigns primary responsibility for devising machinery to regulate air pollution to state governments, subject to review by the Department of Health, Education and Welfare. In the formulation of responses at the state and local levels, perhaps greater assistance will come from economists and others who recognize that the legal attack on air pollution requires a new strategy, not just further adaptations of old approaches designed to deal with zoning and nuisances. The economic theorists' distinctive approach to the air pollution problem is characterized by the belief that the objective of abatement programs should be to minimize air pollution damage costs and the costs incurred in any program to alleviate that damage. This approach would calculate the damage to each receptor from polluted air, measure the benefits to be expected from abatement projects, then calculate the cost of abatement to each pollutant source. The optimal allocation of the air resource would require that pollutants be prevented from entering the atmosphere at levels which would inflict more marginal damage on receptors than the marginal cost to the source of preventing the pollution. The operational procedure to achieve this optimal condition would include an evaluation of the damage done by the emission of incremental amounts of pollutant into the air at any given location and time and an assessment of a corresponding charge against the emitters. The charge would thus reflect the marginal costs that the sources impose on others. It would be determined by relating ambient air quality criteria to emission rates, using air monitoring networks and atmospheric diffusion models.
APTIC-26205

HEALTH EFFECTS RESEARCH PROGRAM OF THE NATIONAL AIR POLLUTION CONTROL ADMINISTRATION.

Preprint, Williams Coll., Williamstown, Mass.,
27p., 1970. 27 refs. (Presented at the Summer
Study on Critical Environmental Problems,
Williamstown, Mass., July 1970.)
Vaun A. Newill, Gory J. Love, F. Gordon Hueter, and Robert J. M. Horton.
Identifiers: *Control agencies, *Federal governments, *Plans and programs, Area surveys, Research programs, Advisory services, Air quality criteria, Socio-economic factors, Epidemiology, Data analysis.

The Division of Health Effects Research of the National Air Pollution Control Administration has as its stated mission the supplying of health related intelligence for inclusion in air quality criteria documents. Activities are restricted to a limited portion of the ecosystem of which man is a part, that portion which describes the deleterious effects of pollutants on the health of man. The program consists of three major tasks: supplementation of existing intelligence concerning the health effects of single or combinations of pollutants for air quality criteria documents; community health effects surveillance to assure that ambient air pollution levels, after the implementation of approved standards, do in fact protect human health; and provision of consultation or technical assistance services where both a knowledge of health effects of pollutants and medical or biological expertise is required. During the time period 1971-1976, twenty-four additional air quality criteria documents are planned for issuance. Nine of the public documents will be considered for revision if need be. The research plans and priorities of DHER are determined completely by the set of deadlines established by this schedule for production of documents. Another aspect of the Division's program is the Community Air Pollution Health Effects Surveillance. This concept has been developed because the effects of air pollution and socio-economic levels are too frequently confounded in community studies. Industrialized, polluted areas of a city usually are inhabited by residents of lower economic levels, while the middle and upper-middle class populations tend to reside in the relatively clean suburban fringe. Attempts to compare populations of clean and polluted sectors of the same city too often result in a contrast between lower class, polluted and upper class, clean sectors. A second problem in community studies of air pollution is the multiplicity of individual pollutants in the air of the more polluted area when clean vs. polluted comparisons are made. If a health effect is more prevalent in the polluted area, it is often impossible to specify which of the many components of atmospheric pollution is responsible for the effect and should, therefore, be controlled. The Community Air Pollution Health Effects Surveillance Program is designed to obtain comparable socio-economic groups and to isolate the effects of individual pollutants insofar as this is possible in community studies.
APTIC-26213

13. SOCIAL ASPECTS

NATIONAL SURVEY OF THE ODOR PROBLEM. PHASE I OF A STUDY OF THE SOCIAL AND ECONOMIC IMPACT OF ODORS: APPENDIX.

Copley International Corp., Contract NAPCA 22-69-50, 342p., Jan. 1970. NTIS: PB 194377
Personal Author Not Recorded.

Identifiers: *Odors, *Area surveys, *Socio-economic factors.

Fourteen appendices are compiled in support of Phase I of the National Survey of the Odor Problem. They include a list of the major odor-producing air pollutants with olfactory thresholds and related data, the questionnaire used in the survey, locations of the survey areas, and tabulated summaries of survey findings. For all survey cities combined, opinions of residents are summarized, respectively, by income, occupation, age, and education. Summaries are also presented of the opinions of residents of the individual cities and of the combined opinion of businessmen in all cities surveyed. For survey plan and analysis of results, see NTIS: PB 194376.
APTIC-24768

LET'S GANG UP ON POLLUTION.

For primary bibliographic entry see Field 03.
APTIC-25729

TWO SPEECHES MADE BY MONSIEUR GEORGES POMPIDOU PRESIDENT OF THE FRENCH REPUBLIC.

(Discours prononces par Monsieur Georges Pompidou, President de la Republique Francaise).
Text in French. Pollut. Atmos (Paris), 8 (47):149-150, July-Sept., 1970.
Personal Author Not Recorded.
Identifiers: *Education, *Federal governments, *Social attitudes, *France, Plans and programs, Proposals, Regulations, Public affairs, Socio-economic factors.

A speech given February 28, 1970, at Chicago by the President of the French Republic is devoted completely to air pollution problems, of which the complete text is given, together with his declaration to the Council of Ministers at Paris on June 10, 1970. Chicago, with its 8 million inhabitants, a gross national product of 46 billion dollars, an average annual family income of $14,000.00 and a steel production greater than that of all France, is a symbol of the 20th century dream of human progress. It also symbolizes the more recent discovery that man's environment, which seemed at the beginning of the century an omnipotent monster to be tamed by man's resourcefulness, is in reality a fragile entity, which man must now preserve carefully if human life is to continue. Ironically, the automobile, conceived as the great liberator, has become the great paralyzer of city transportation. Society as an organized body has also failed to adapt to the new problems created by rapid progress. The manner in which problems multiply casts doubt on the belief that progress is a linear chain extending in the direction of greater and greater human happiness. We must create and develop a kind of 'environmental morality' imposed at every level, from the state down to the individual, if the air is to remain breathable. Pollution is as much the responsibility of national and state governments as it is of those who govern the great urban complexes. The American and French governments have agreed to cooperate at the scientific and technological level in solving the problems of urbanism, pollution control, and transportation. The Presidential Decree announces the beginning of a campaign against the 'harmful effects' of industry and its products. He calls for a policy of architecture and construction that gives thought to other factors besides function and the making of money, education of the public to respect nature, the development of national parks, stricter control of hunting and fishing, and the encouragement of outdoor recreation.
APTIC-25730

THE GROWTH OF PUBLIC OPINION.

In: Problems and Control of Air Pollution. F. S. Mallette (ed.), New York, Reinhold, 1955, Chapt. 1, p. 1-11.
Hugh E. C. Beaver.
Identifiers: *Legislation, *Social attitudes, *Great britain, Abatement, Air pollution episodes, Economic losses, Federal governments, Smokes.

The historical development of public concern over air pollution in England is briefly summarized as a critical element in pollution control, since good legislation in itself is ineffective unless public opinion supports its enforcement. Royal discomfort from London smoke is recorded some 700 years ago, and at the end of Elizabeth the First's reign the use of coal in London was banned during a Parliament Session. By 1819, pressure had led to the appointment of the first of a whole dynasty of 'smoke' committees, and anti-smoke laws for London were enacted in 1853 and 1856. In general, these and succeeding efforts for many years were disjointed and ephemeral, and industrial prosperity was valued above control efforts which might interfere. A Government Committee report in 1921 led to advances until the needs of World War II halted them. The 1952, London Smog disaster was a watershed for public concern and led to another government inquiry committee whose 1954 report is described in some detail, including its proposals for new legislation, smokeless zones and smoke-control areas, enforcement measures, and a Clean Air Council. The widespread approval and demands for action called forth by this report are attributed to the atmosphere of public opinion being suitable and receptive at that moment.
APTIC-25776

INTRODUCTION AND RESEARCH RECOMMENDATIONS.

In: Project Clean Air. California Univ., Berkeley, Task Force No. 3, Section 1, 11p., Sept. 1, 1970. 4 refs.
Paul B. Downing.
Identifiers: *Research programs, *Socio-economic factors, Control programs, Regulations, Public information, Standards, Research methodologies, Simulation.

Project Clean Air aids advancing technology through research done by its staff and through independent analysis by its staff of the technological developments of others. An approach is recommended which explicitly recognizes the interaction between man, his institutions, and his technology. The social scientist's explanation of why pollution problems still exist include the lack of effective private enterprise action, the lack of effective public action, and the lack of effective governmental control action. Study is needed to determine the most effective means of implementing the policies of the decision makers. The possible regulatory forms recommended for comparative analysis are prescriptive regulations, effluent standards, air quality standards, pricing and taxing systems, and property rights restructuring. Study is needed to determine the current public acceptance of alternative policies, as well as the relationship between proposed air pollution control policies and problems such as the income of the urban poor, the urban social structure, the transportation of people and goods, and the political structure. It is necessary to develop estimates of the cost of alternative control devices. A research project is described with the goal to develop a model of an air shed which interrelates its physical, economic, and social characteristics and to use this model to simulate the effect of alternative air pollution control policies.
APTIC-25839

AIR POLLUTION: A SOCIOLOGICAL PERSPECTIVE.

In: Project Clean Air. California Univ., Berkeley, Task Force 3, Vol. 3, Section 2, p. 2-1 to 2-32, Sept. 1, 1970. 60 refs.
Harvey Molotch, and Ross C. Follet.
Identifiers: *Public affairs, *Social attitudes, Socio-economic factors.

An attempt is made to provide a basis for explicit sociological research on the subject of air pollution. To this end attention is drawn to those few studies which constitute the beginning of sociological 'data' on air pollution. Simultaneously, the general framework and basic concepts of sociology are utilized to provide a sociological perspective on the pollution problem. Specific topics discussed are the theory of the 'cultural lag', the questioning of productivity, people's reaction to air pollution, clean air as a social movement, clean air and community organization, air pollution and the structure of power, and air pollution and the mobilization of bias. Finally, suggestions are made as to the form future research should take.
APTIC-25983

BESANCON.

(Besancon). Text in French. Pollution Atmospherique (Paris), vol. 12:67-69, May 1970.
Personal Author Not Recorded.
Identifiers: *Meetings, *Public information, *Besancon, Abatement, Education, Regional governments, Students, Bronchial cancer, Lung cancer, France, Urban areas.

This is one of a series of reports of local committees for Clean Air Week in France. This report concerns the geographical section of France designated as the Besancon area. The campaign began in early October 1969, simultaneously with an anti-tuberculosis drive. The president of the regional committee was given an opportunity by the regional prefect to appear on television on behalf of the drive against air pollution. Air pollution due to carbon monoxide, sulfur dioxide, and dust has been monitored daily in city of Besancon since 1966 by the Municipal Board of Health, the School of the Sciences, and the School of Medicine of Besancon. The number of inhabitants affected with bronchopulmonary cancer in 1967 was double the figure of 1957 (3.3% as compared with 1.4%). At the same time, there is a shortage of public park space in the city, (2.18 square meters of 'green space' per capita). The committee sponsored an exposition at City Hall, which was seen by large numbers of schoolchildren, garages agreed to give free carburetor adjustments, and prizes were awarded in an air pollution contest for school children.
APTIC-26225

DIFFERENTIAL RESPONSES TO AIR POLLUTION AS AN ENVIRONMENTAL HEALTH PROBLEM.

J. Air Pollution Control Assoc., 20 (12):814-818, Dec. 1970. 8 refs.
Ralph N. Creer, Robert M. Gray, and Michael Treshow.
Identifiers: *Socio-economic factors, *Cognitive dissonance, Opinion surveys, Steel, Primary metallurgical processing.

An attempt was made to determine what influence, if any, economic dependence would have upon one's perception of a pollution problem relative to its seriousness and perceived control effort. The study is based upon the proposition that the public, in the final analysis, is going to play a major role in determining future programs for dealing with air pollution as well as other environmental health problems. Central to this premise is the notion that people must first recognize a given condition as a problem before they can be expected to respond accordingly, and that their value judgments concerning the problem will affect their willingness to support programs designed to prevent such a condition. Principles of cognitive dissonance were used to predict how individuals would perceive a given problem based on the amount of dissonance or strain they experience as a result of economic dependence upon a local source of air pollution. As propounded by Festinger, the theory of cognitive dissonance states that prolonged inconsistency between the actions and beliefs of a human being creates strain or dissonance which in turn tends to affect one's perception, causing him to selectively perceive or misperceive the various aspects of a problem situation. A small Utah community of approximately 7000 people was selected, since it was only a short distance from a large steel plant which employed an estimated 40% of the town's population. Eighty percent in the low economic dependence

group of a random sample of the population were highly 'bothered' compared to only 19% in the high economic dependence group.
APTIC-26303

14. GENERAL AND MISCELLANEOUS

AIR POLLUTION TRANSLATIONS: A BIBLIOGRAPHY WITH ABSTRACTS-VOLUME I.

Rept. AP-56, 173p., May 1969. 558 refs.
Personal Author Not Recorded.
Identifiers: *English translations, Sources, Atmospheric phenomena, Measurement methods, Control methods, Diseases and disorders, Plants (botany), Air quality measurements, Materials deterioration, Socio-economic factors, Legal aspects, Standards, Criteria.

A series of 558 articles, representing the results of scientific research and other studies on air pollution that have been published in foreign languages, is presented in bibliographic form with abstracts. The articles are from the Russian, German, Polish, Czech., French, Chinese, Dutch, Japanese, and Spanish languages. The entries are grouped into 13 subject categories: General, Emission Sources, Atmospheric Interactions, Measurement Methods, Control Methods, Human Health Effects, Plants and Livestock Effects, Materials Effects, Economic Effects, Air Quality Measurements, Legal and Administrative Aspects, Standards and Criteria, and Basic Science and Technology. An Author Index, Language Index, and Subject Index are provided. All articles are coded and can be obtained from the Air Pollution Technical Information Center (APTIC).
APTIC-12493

CONSTRUCTION OF POWER PLANT STACKS IN THE LIGHT OF PRACTICAL EXPERIENCE.

(Betriebserfahrungen mit Kraftwerkschornsteinen und ihre Konstruktion). Text in German. Mitt. Ver. Grosskesselbesitzer, 48 (6):436-444, Dec. 1968.
W. Wein.
Identifiers: *Electric power production, *Stacks, *Design criteria, Concrete, Corrosion, Steel, Surface coating operations, Germany, Sulfuric acid, Carbon dioxide, Sulfur dioxide, Sulfur trioxide, Temperature.

The three types of power plant stacks which perform satisfactorily are single or collecting stacks with a shaft of brickwork, steel concrete or a combination with an acid resistant lining with or without a space that can be ventilated, single concrete stacks with a suspended insulated steel flue duct, and a frame structure with several suspended insulated steel flue ducts. Stacks can be damaged by excessive thermal stress, by too short a drying time, and by corrosion of and damage to brickwork, mortar or concrete. To prevent excessive thermal stress, heat conduction stacks must be lined to a height of from one third to one half with a thermal protective lining, but a lining of the entire height of the stack is recommended, especially for steel concrete shaped brick stacks. The maximal permissible temperature difference between the outside and the inside surface of brickwork stacks, depending on thickness, is 140 C; for steel concrete and concrete brick stacks, 20 C. These temperatures must be periodically checked. Newly constructed stacks must be brought into operation very slowly so that the humidity in the mortar or concrete are not expelled to quickly. The danger of corrosion caused by the oxidation of sulfur dioxide to sulfur trioxide, the formation of sulfuric acid and its condensation can be minimized by firing with a small surplus of air which reduces the condensation point of H2S04. Measuring instruments recommended for smokestack damage prevention should measure pressure or underpressure in the flue and in the space between the lining and stack, the temperature gradient of the flue gas from foot to top of the stack, carbon dioxide content between stack and lining, and the temperature difference between the inside and outside walls of the stack.
APTIC-22794

A SCIENTIFIC-TECHNICAL CONFERENCE ON DECONTAMINATION OF INDUSTRIAL EFFLUENTS AND ATMOSPHERIC DISCHARGES.

(Nauchnotekhnicheskoye soveshchaniye po obezvrezhivaniyu stochnykh vod i atmosfernykh vybrosov). Text in Russian. Gigiena i Sanit., no. 6:101-102, 1970.
I. I. Belyayev.
Identifiers: *Abatement, *Meetings, Chemists, Engineers, Management personnel, Medical personnel, Sanitarians, Ussr, Urban areas, Stack gases, Industrial emission sources, Chemical processing, Warer pollution, Chemical composition.

A two-day conference is reported, attended by scientific workers, chemists, engineers, and doctors working in the area of sanitary protection of the waters and atmosphere in populated regions, as well as directors of chemical plants and research institutions in the cities of Dzerzhinsk, Gork'iy, Moscow, Leningrad, Severo-Donetsk, and Tula. More than 50 papers were presented under three general topics: information characterizing the sanitary state of natural waters and air, and the composition of industrial wastes generated by 'big chemistry'; experience in decontaminating industrial effluents; and decontamination of atmospheric emissions.
APTIC-24627

AIR POLLUTION.

Ind. Eng. Chem., 43 (12):2687-2693, Dec. 1951. 40 refs.
Frederick G. Sawyer.
Identifiers: *Regulations, *Smog, *Industrial emission sources, Abatement, Legislation, Planning and zoning, Eye irritation, Los angeles, Engine exhausts, Stack gases, Open burning, Visibility, Control equipment, Meteorology, Carbon monoxide, Sulfur dioxide.

Rapid population growth of many western cities has focussed attention to periodic murkiness of the atmosphere. Much publicity has been given to Los Angeles smog. A four-year study by Stanford Research Institute indicates that the daily burning of nearly 50,000 tons of fuels and rubbish is the principal cause of Los Angeles smog. Research shows further that this burning by the public and industry emits to the air each day at least 2000 tons of chemicals, such as sulfur dioxide and carbon monoxide, which can cause poor visibility, eye irritation, and other smog effects. The community aspects of air pollution complicate the means for abatement. Significant pollutants are emitted from automotive engines and backyard incinerators, as well as industry. Industry's responsibility to the community makes it necessary that its house be in order. It is good public relations to be a good neighbor by abating nuisance effluents. Enlightened management will regard potential air pollution as an important factor in plant location. A scientific study of wastes discharged to the air and their dissipation by meteorological conditions may save some of the cost of corrective equipment. Air pollution regulations are becoming more stringent. Only scientific study and industry cooperation can ensure intelligent legislation concerning air pollution abatement. (Author abstract)
APTIC-24759

ORGANIZATION OR DEVELOPMENT OF EUROPEAN COOPERATION IN RESEARCH, STANDARDIZATION, AND DOCUMENTATION CONCERNING THE CAMPAIGN AGAINST AIR POLLUTION.

Preprint, Council of Europe, 3p., 1964. (Presented at the European Conference on Air Pollution, Strasbourg, France, Jan. 15, 1964.)
F. Hartogensis.
Identifiers: *Research methodologies, *Europe, *Abatement, Administration, International, Data analysis.

Efforts of European collaboration in the field of air pollution can be better coordinated through meetings of experts; exchange of technical personnel between two or more countries; exhange of official documents between member countries of the Council of Europe; and creation of a center for the exchange of scientific, medical, technical, and economic documents.
APTIC-25628

TERMINOLOGY AND UNITS OF MEASURE.

Preprint, Council of Europe, 8p., 1963. (Presented at the European Conference on Air Pollution, Strasbourg, France, Sept. 26, 1963.)
F. Hartogensis.
Identifiers: *Measurement methods, *Standards, *The netherlands, Europe, Dusts.

In The Netherlands, air pollution is gauged by the measurement of concentrations and, in certain cases, of deposits (e.g., solid insoluble dust) over a specified period. Concentrations are expressed in micrograms per cu m, while dust particles are counted per milliliter. It is also customary to give the concentration of gases in ppm, or in micrograms per standard cu m of air. Sometimes the quantity of smoke is indirectly measured by drawing a known quantity of air through filter paper and estimating the degree of blackening. By refernce to a standard scale, the blackening is expressed in micrograms of 'standard smoke' per cu m of air. The deposit of certain substances, for example, total solid substances, solid substances soluble in water, and soluble sulfate is given in milligrams per sq m per day. A table of national and proposed international units of measure is appended, and a suggestion made for a multi-lingual glossary of ambiguous air pollution terms.
APTIC-25629

ATMOSPHERIC IMPURITIES AND THE PROBLEM OF OBTAINING EXTRA PURE SUBSTANCES.

(Atmosfernyye zagryazneniya i problema polucheniya osobo chistykh veshchestv). Text in Russian. Khim. Prom. (Moscow), 44 (2):124-126, 1968. 22 refs.
B. D. Stepin.
Identifiers: *Control methods, *Mathematical analyses, Ussr, Chemical reactions.

The lowest impurity concentration that can be attained in a substance undergoing a process of purification by repeated extraction, distillation, and the like depends on the degree of contamination of the medium in which this process is taking place. This may be seen from the equation specifying the outcomes of the successive stages of such a type of process in the simplest case: c (n) equals c (o) exp (-an) + b (1-exp (-an))/a, where c (o) is the initial impurity concentration; c (n), its concentration after completion of the nth stage of the process; a, the degree of elimination of the impurity from the substance at every stage; and b, the degree of enrichment of the substance by the contaminant transferred to it from the medium at every stage. Solving this equation for n, one obtains, in the case when a equals 1: n equals ln ((c (o)-b)/ (c (n)-b)), showing that as b approaches c (n), the number, n of stages required to attain the concentration c (n) tends to infinity. While the adverse effect of external contaminants is commonly taken into account in selecting the materials used in the manufacture of chemical equipment. The possibility of contamination of the product by contaminants present in the atmosphere is all too frequently ignored in designing purification processes. The present level of atmospheric pollution is such that pure substances with impurity concentrations of less than 0.00001 to 0.0001 weight % cannot be produced unless the purification process is carried out in an artificial 'chemically sterile' environment. The technical difficulties of creating and maintaining such environments

are pointed out. The greater part of the paper is devoted to information on air pollution gathered from the literature.
APTIC-25676

AIR POLLUTION TRANSLATIONS: A BIBLIOGRAPHY WITH ABSTRACTS – VOLUME 2.

NAPCA Pub. AP-69, 119p., April 1970. 444 refs.
NTIS: PB 196174
Personal Author Not Recorded.
Identifiers: *Control agencies, *Data analysis, Administration, Criteria, Governments, Legal aspects, Standards, Laboratory animals, Humans, Plant damage, Hematology, Nervous system, Respiratory system, Respiratory functions, Cancer, Health impairment, Respiratory diseases, Construction materials, Corrosion, Paints, Europe, United states, Automotive emissions, Stack gases, Particulates, Industrial emission sources, Non-industrial emission sources, Air quality measurements, Analytical methods, Measurement methods, Control equipment, Automotive emission control, Sulfur oxides control, Carbon monoxide, Nitrogen oxides, Sulfur dioxide.

This is the second volume in a continuing series of compilations presenting abstracts and indexes of translation of technical air pollution literature. It is published as an integral part of the Air Pollution Technical Information Center's (APTIC) task of gathering, processing, and disseminating the world's technical literature on air pollution. There are 444 entries grouped into 12 subject categories. Within the categories the entries are arranged according to APTIC accession numbers. An Author Index, A Language Index, and a Subject Index are included in which the entries are referenced according to accession number. (Author introduction modified)
APTIC-25930

AUTOMATED DESIGN OF STEEL-FRAME SUPPORTED CHIMNEYS.

(Tetto shiji gata entotsu sekkei no jidoka). Text in Japanese. Doboku Gakkai shi (J. Japan Soc. Civil Engrs.), 55 (12):34-41, Dec. 1970.
N. Tani, H. Moriwaki, and M. Araki.
Identifiers: *Computer programs, *Design criteria, *Stacks, Japan.

Electronic computers for automatic designing save labor and improve the quality of designs. Such elements as stress analysis and basic design have been automated with use of the computer for construction of steel frame supported stacks, which are in much demand to prevent air pollution. Various dimensions of the chimney, types of support, load conditions, and other factors are fed into the computer as input data, in order to find the cross section, as well as joint measurements, and material specifications required. An application is depicted for a 180 m stack.
APTIC-26015

SUBJECT INDEX

ABATEMENT
POLLUTION CONTROL   A CORPORATE DILEMMA.
APTIC-23612 12

A SCIENTIFIC-TECHNICAL CONFERENCE ON DECONTAMINATION OF INDUSTRIAL EFFLUENTS AND ATMOSPHERIC DISCHARGES.
APTIC-24627 14

APTIC-24627 14

INITIATIVE FOR WATER AND AIR POLLUTION CONTROL.
APTIC-24683 02

ABATEMENT OF AIR POLLUTION IN THE CHEMICAL INDUSTRY.
APTIC-24743 01

COSTS OF CONTROLLING GRAY IRON CUPOLA EMISSIONS.
APTIC-24827 10

AIR POLLUTION ABATEMENT PROCEDURES UNDER THE CLEAN AIR ACT.
APTIC-24948 12

SUMMARY OF THE AIR QUALITY ACT OF 1967.
APTIC-24950 12

INDUSTRY, ENVIRONMENT AND ENVIRONMENTAL PROTECTION.
APTIC-25541 12

THE LEGAL BASIS OF AIR POLLUTION CONTROL.
APTIC-25555 12

ROLE OF THE FEDERAL GOVERNMENT IN AIR POLLUTION CONTROL.
APTIC-25595 12

THE ROLE OF PRIVATE NUISANCE LAW IN THE CONTROL OF AIR POLLUTION.
APTIC-25596 12

THE MISDEMEANOR APPROACH TO POLLUTION CONTROL.
APTIC-25597 12

ORGANIZATION OR DEVELOPMENT OF EUROPEAN COOPERATION IN RESEARCH, STANDARDIZATION, AND DOCUMENTATION CONCERNING THE CAMPAIGN AGAINST AIR POLLUTION.
APTIC-25628 14

AIR POLLUTION, PRE-EMPTION, LOCAL PROBLEMS AND THE CONSTITUTION--SOME PIGEONHOLES AND HATRACKS.
APTIC-25671 12

AIR POLLUTION AND GOVERNMENT STRUCTURE.
APTIC-25763 12

CONSIDERATIONS ON IMPROVING THE ENVIRONMENTAL PROTECTION.
APTIC-26061 12

EUROPEAN LEGISLATION ON POLLUTION AND WASTE DISPOSAL.
APTIC-26070 12

AIR POLLUTION IN THE UNITED STATES.
APTIC-26090 12

URBAN PLANNING ASPECTS OF AIR POLLUTION ABATEMENT.
APTIC-26157 12

DEFICIENCIES IN THE AIR QUALITY ACT OF 1967.
APTIC-26196 12

LEGISLATING FOR AIR QUALITY MANAGEMENT   REDUCING THEORY TO PRACTICE.
APTIC-26205 12

THE ROLE OF THE WINDS WITH SOUTHERN COMPONENT IN THE AIR POLLUTION.
APTIC-26294 05

ABATEMENT FEDERAL GOVERNMENTS
CONGRESS MAKES FURTHER PROGRESS ON ANTIPOLLUTION LEGISLATION.
APTIC-26068 12

ABSENTEEISM
EFFECTS OF AIR POLLUTION ON SCHOOL ABSENCES AND DIFFERENCES IN LUNG FUNCTION IN FIRST AND SECOND GRADERS IN BERLIN, NEW HAMPSHIRE, JANUARY 1966 TO JUNE 1967.
APTIC-25563 07

ABSORPTION
THE AMOUNT OF SULPHUR TRIOXIDE ACCUMULATED ON FIBRE-GLASS FILTERS USED FOR DETERMINING DUST CONTENT IN FLUE GASES.
APTIC-24584 03

EVALUATION OF THE PROCESS OF OBTAINING AROMATIC HYDROCARBONS FROM COKE-OVEN GAS.
APTIC-24620 02

A PARTIAL POLLUTION SOLUTION   PLANT TREES.
APTIC-24622 02

AN ABSORPTION APPARATUS FOR GAS ANALYSIS.
APTIC-24651 03

INVESTIGATION OF THE PROCESSES OF MASS EXCHANGE AND CHEMOSORPTION IN ROTATION-TYPE EQUIPMENT.
APTIC-24769 02

POLLUTION OF CULTIVATED PLANTS WITH LEAD FROM AUTO EXHAUST.
APTIC-24788 08

EFFECT OF SURFACE-ACTIVE AGENTS ON THE RATE OF ABSORPTION.
APTIC-24790 06

ABSORPTION OF NO AND NO2 IN SMALL AND LARGE CONCENTRATIONS THROUGH INHALATION.
APTIC-24820 07

COMPARISON OF THE EFFECTS OF SULPHUR DIOXIDE AND OF THE DERIVATIVES OF FLUORINE ON A FEW PLANTS.
APTIC-24852 08

LEASE-GAS SWEETENING. PART 6. HOT CARBONATE--ANOTHER POSSIBILITY.
APTIC-24871 02

THE HYGIENIC ASPECTS OF THE PRODUCTION AND USE OF LEAD ANTIKNOCK COMPOUNDS.
APTIC-24876 07

APPARATUS FOR EFFECTING INTIMATE CONTACT BETWEEN A GAS AND A LIQUID.
APTIC-25600 02

METHOD FOR THE REMOVAL OF FLUORINE FROM INDUSTRIAL GASES.
APTIC-25658 02

THE CURRENT LEAD CONTENT IN VEGETATION GROWING IN THE VICINITY OF SWISS HIGHWAYS.
APTIC-25878 08

THE EFFECTS OF THE ABSORPTION OF FLUORIDE. V. THE CHEMICAL DETERMINATION OF FLUORIDE IN HUMAN SOFT TISSUES FOLLOWING PROLONGED INGESTION OF FLUORIDE AT VARIOUS LEVELS.
APTIC-25946 07

PHYSIOLOGIC PROCESSES IN ABSORPTION OF POLLUTANTS.
APTIC-25988 07

METHOD FOR THE DESULFURIZATION OF GASES CONTAINING HYDROGEN SULFIDE OR SULFUR DIOXIDE AND FOR THE PREPARATION OF CRYSTALLINE SULFUR.
APTIC-26163 02

ABSORPTION (GENERAL)
SYSTEMS STUDY FOR CONTROL OF EMISSIONS. PRIMARY NONFERROUS SMELTING INDUSTRY. (FINAL REPORT). VOLUME II   APPENDICES A AND B.
APTIC-12751 02

SYSTEMS STUDY FOR CONTROL OF EMISSIONS. PRIMARY NONFERROUS SMELTING INDUSTRY. (FINAL REPORT). VOL I.
APTIC-12823 02

IMPROVEMENTS IN RECOVERY OF SULPHUR DIOXIDE FROM GASES.
APTIC-24591 02

PRODUCTION OF SULFUR TRIOXIDE AND SULFURIC ACID.
APTIC-24628 02

A NOVEL PROCESS FOR NEUTRALIZING AN ALKALINE WASTE WATER AND FOR DESULFURIZING SMOKE.
APTIC-24645 02

DISPOSAL OF WASTE GAS CONTAINING DILUTE SULFUR OXIDE.
APTIC-24673 02

SIMULTANEOUS RECOVERY OF LOW-CONCENTRATION SULFUR OXIDES AND NITROGEN OXIDES WITH ALKALIES AND CARBONATES. IV. ABSORPTION WITH MAGNESIUM HYDROXIDE.
APTIC-24704 06

PURIFICATION OF FUMES IN THE LACQ COMPLEX.
APTIC-24706 02

ABSORPTION OF SO2 GAS BY VARIOUS SOLVENTS.
APTIC-24735 02

INSTALLATION FOR THE ABSORPTION OF SULFUR DIOXIDE.
APTIC-24750 02

AMMONIA PROCESS FOR REMOVAL OF SULFUR DIOXIDE FROM FLUE GAS.
APTIC-24763 02

METHOD TO REMOVE SULFUR DIOXIDE FROM ATMOSPHERIC AIR OR WASTE GAS.
APTIC-24812 02

MANUFACTURING METHOD FOR SULFUR DIOXIDE ABSORBENT.
APTIC-24815 02

THE ABSORPTION OF SULFUR DIOXIDE IN WATER.
APTIC-24868 02

INVESTIGATION OF MASS TRANSFER IN A SCRUBBER WITH TAPERED-SLOT TRAYS.
APTIC-24885 02

PH VALUE OF AMMONIUM SULFITE-BISULFITE SOLUTIONS.
APTIC-24895 02

NEW POTENTIAL ABSORBENTS FOR SULFUR OXIDES REMOVAL FROM FLUE GAS.
APTIC-24932 02

RECOVERY OF SO2.

APTIC-25560 02

TRAIL SOLVES ITS SULPHUR PROBLEM.
APTIC-25589 02

APPARATUS FOR PURIFYING FLUE GASES.
APTIC-25603 02

REMOVAL OF SO2 GAS.
APTIC-25742 02

PURIFICATION OF INDUSTRIAL EXHAUST GASES.
APTIC-25743 02

ABSORPTION OF SULFUR DIOXIDE IN A VENTURI TUBE.
APTIC-25768 02

SULPHUR REMOVAL FROM GASES.
APTIC-25814 02

METHOD AND DEVICE FOR THE DESULFURISATION OF GASES, ESPECIALLY FLUE GASES AND OTHER WASTE GASES.
APTIC-25838 02

ELECTROCHEMICAL PROCESS FOR RECOVERING SULFUR VALUES.
APTIC-25913 02

TESTING OF AN EXPERIMENTAL INDUSTRIAL ABSORBER WITH MOBILE PACKING.
APTIC-26019 02

CONCENTRATION/RECOVERY METHOD FOR LOW-DENSITY SULFUR DIOXIDE.
APTIC-26039 02

AN ABSORPTION SCRUBBER FOR DESULFURIZATION.
APTIC-26159 02

PROCESS FOR THE REMOVAL AND RECLAMATION OF SULFUR DIOXIDE FROM FLUE GASES.
APTIC-26168 02

THE BURKHEISER GAS PURIFICATION PROCESS FOR THE RECOVERY OF AMMONIA, CYANOGEN AND HYDROGEN SULFIDE.
APTIC-26201 02

THE TECHNICAL PROCESSES FOR THE DESULFURISATION OF GASES.
APTIC-26202 02

A PROCESS FOR REMOVING SULPHUR DIOXIDE FROM WASTE GASES.
APTIC-26246 02

REMOVAL OF SULFUR DIOXIDE FROM STACK GASES BY SEA WATER.
APTIC-26248 02

PROCESS FOR REMOVING SULPHUR DIOXIDE FROM A GAS.
APTIC-26272 02

ACETATE
A COMPARISON OF METHODS FOR TESTING THE FASTNESS TO GAS FADING OF DYES ON ACETATE.
APTIC-26167 03

ACETYL RADICAL
THE FORMATION AND DECOMPOSITION REACTIONS OF THE ACETYL RADICAL AND THE HEAT OF FORMATION OF THE ACETYL RADICAL.
APTIC-25828 06

ACETYLENES
THE REACTION OF ORGANIC ANIONS WITH CARBON MONOXIDE. (FINAL REPORT).
APTIC-25852 06

ACID SMUTS
FORMATION AND THEIR PREVENTION OF ACID SMUTS AT OIL FIRED BOILER.
APTIC-24817 02

ACID SMUT EMISSION PROBLEMS STUDIED.
APTIC-26118 02

ACID-BASE EQUILIBRIUM
DISTURBANCE OF ACID-BASE AND ENZYME EQUILIBRIUM IN EXPERIMENTAL INTOXICATION WITH SO2 AND PROTECTIVE ACTION OF AMMONIA.
APTIC-26138 07

ACOUSTIC SOUNDING
ACOUSTIC SOUNDING--A NEW APPROACH TO THE STUDY OF ATMOSPHERIC STRUCTURE.
APTIC-25622 03

ACOUSTIC METHODS FOR THE REMOTE PROBING OF THE LOWER ATMOSPHERE.
APTIC-26150 03

ACOUSTIC WAVES
ON THE INTERACTION OF AEROSOL PARTICLES WITH ACOUSTIC WAVE IN THE PRESENCE OF HIGH FREQUENCY ELECTRIC FIELD.
APTIC-24624 06

ACROLEIN
A STUDY OF THE EFFECTS OF AIR POLLUTANTS ON THE EYE.
APTIC-25756 07

ACRYLATE
A NEW GLUE HOLDS RIGID CUP ECG SKIN ELECTRODES FOR 24 HOURS AND LONGER.
APTIC-25626 07

ADAPTATION
ADAPTATION TO OZONE.
APTIC-25906 07

ADHESIVES
A NEW GLUE HOLDS RIGID CUP ECG SKIN ELECTRODES FOR 24 HOURS AND LONGER.
APTIC-25626 07

ADMINISTRATION
A SUGGESTED PROGRAM FOR THE SACRAMENTO REGION.
APTIC-24059 12

STRUCTURE AND WORK OF THE AIR POLLUTION CONTROL ADMINISTRATION IN THE FEDERAL REPUBLIC OF GERMANY-EXPERIENCES, PROBLEMS, INTEPNATIONAL COMPARISONS.
APTIC-25551 12

ADMINISTRATIVE NEEDS AND PATTERNS OF AIR-POLLUTION CONTROL.
APTIC-25774 12

REQUESTS AND OPINIONS CONCERNING THE ADMINISTRATION OF THF ENVIRONMENTAL STANDARD FOP SULFUR OXIDES.
APTIC-26111 12

ADSORPTION
DISPOSAL METHOD FOR SULFUROUS ACID CONTAINED IN WASTE GAS.
APTIC-24643 02

MANUFACTURING METHOD OF ACTIVATED CHARCOAL.
APTIC-24672 02

ADSORPTION DESULFURIZATION METHOD FOR GASEOUS SUBSTANCES CONTAINING HYDROGEN SULFIDE.
APTIC-24818 02

ADSORPTION OF HYDROCARBONS ON GRAPHITIZED CARBON.
APTIC-25621 02

USE OF THERMODESORPTION TECHNIQUE FOR STUDYING GAS ADSORPTION CARBON MONOXIDE ON NICKEL.
APTIC-25866 06

POWER AND INDUSTRY HYDROCARBONS AND OTHER ORGANIC SPECIES.
APTIC-26231 02

PERFORMANCE TEST METHOD FOR VENTILATOR/AIR PURIFIER (FOR DELETERIOUS GAS), DRAFT.
APTIC-26295 02

ADSORPTION (GENERAL)
DESULFURIZATION OF FLUE GAS WITH ADSORPTION COKE OF VARIABLE PROPERTIES.
APTIC-24709 02

GAS PURIFICATION DEVICE.
APTIC-24821 02

METHOD OF ELIMINATING SULFUR DIOXIDE AND HYDROGEN SULFIDE FROM EXHAUST GAS.
APTIC-24846 02

PROCESS FOR SEPARATING SULPHUR DIOXIDE FROM GAS MIXTURES AND APPARATUS THEREFOR.
APTIC-25614 02

COMBUSTION EMISSION GAS DISPOSAL METHOD.
APTIC-26104 02

REACTIVITY OF FERRIC OXYHYDROXIDE TO SULFUR DIOXIDE.
APTIC-26126 02

METHOD FOR THE PRODUCTION OF ELEMENTARY SULFUR FROM GASES CONTAINING HYDROGEN SULFIDE.
APTIC-26238 02

ADVISORY SERVICES
APPLICATIONS OF AEROSPACE TECHNOLOGY IN AIR POLLUTION CONTROL.
APTIC-23866 12

EXAMPLES OF TECHNOLOGY ASSESSMENTS FOR THE FEDERAL GOVERNMENT.
APTIC-24604 12

REPORT ON THE STATE OF AIR POLLUTION IN SWITZERLAND.
APTIC-26135 12

AERODYNAMICS
ELECTRODYNAMIC BEHAVIOR OF CHARGED AEROSOL PARTICLES IN AN INHOMOGENEOUS ALTERNATING FIELD AND POSSIBILITIES OF ITS APPLICATION IN DUST ENGINEERING.
APTIC-26041 06

AEROSOL GENERATORS
A FORMATION AND MOVEMENT OF DROPLET (NO. 2) (IN GAS-LIQUID PHASE).
APTIC-24884 06

DOSING OF SMALL AMOUNTS OF DUST BY MEANS OF A DOSATOR WITH A GRANULAR BASE.
APTIC-25906 08

STUDIES ON DROPLET SIZE SPRAYED FROM HOLLOW CONE NOZZLES.
APTIC-26194 06

FABRICATION OF MONODISPERSE LUCITE AND IRON OXIDE PARTICLES WITH A SPINNING DISK GENERATOR.
APTIC-26251 07

AEROSOLS
EFFICIENCY OF IPC-1478 FILTER PAPER AGAINST POLYSTYRENE

LATEX AND DIOCTYL PHTHALATE AEROSOLS.
APTIC-22190 03

ON THE INTERACTION OF AEROSOL PARTICLES WITH ACOUSTIC WAVE IN THE PRESENCE OF HIGH FREQUENCY ELECTRIC FIELD.
APTIC-24624 06

INVESTIGATION WITH THE ELECTRON MICROSCOPE OF AEROSOLS COLLECTED ON MEMBRANE FILTERS.
APTIC-24770 03

APTIC-24770 03

THE PRODUCTION OF NUCLEI BY PHOTOCHEMICAL DECOMPOSITIONS OF HYDROGEN SULFIDE.
APTIC-24779 05

SOUND PROPAGATION IN AN AEROSOL.
APTIC-24806 05

PARTICLE COUNTING TECHNIQUES AVAILABLE FOR AEROSOL RESEARCH.
APTIC-24873 03

AEROSOL STUDIES IN THE REACTOR SAFETY PROGRAM AT OAK RIDGE NATIONAL LABORATORY.
APTIC-24875 01

DEPENDENCE BETWEEN THE CONCENTRATION OF AEROSOLS AND THE INTENSITY OF TURBULENT INTERCHANGE IN LOWER ATMOSPHERE.
APTIC-24904 05

AEROSOL FORMATION FROM GASEOUS AIR POLLUTANTS.
APTIC-24921 05

LIGHT-SCATTERING METHOD OF MEASURING AEROSOL PARTICLES.
APTIC-24974 03

THE ADDITION OF NATURAL RADIONUCLIDES TO AEROSOL PARTICLES AND PRECIPITATION ELEMENTS IN THE ATMOSPHERE.
APTIC-24976 05

PROBLEMS IN AEROSOL FILTRATION.
APTIC-25539 02

DEVICE FOR SAMPLING AEROSOLS.
APTIC-25699 03

AEROSOL PREPARATION, GENERATION, AND ASSESSMENT. PROJECT HARE.
APTIC-25760 03

THE DYNAMIC DILUTION OF AEROSOLS BY MIXING WITH CLEAN AIR.
APTIC-25778 02

THE DYNAMIC BEHAVIOR OF AEROSOLS.
APTIC-25779 06

AN ASYMPTOTIC METHOD FOR SOLVING EQUATIONS OF BROWNIAN MOTION OF AEROSOL PARTICLES.
APTIC-25807 06

ON THE SIMULTANEOUS MEASUREMENTS OF THE PARTICLE SIZE DISTRIBUTION OF RADIOACTIVE CHARGED AEROSOLS AND CONCENTRATION RATIO OF POSITIVE TO NEGATIVE.
APTIC-25834 03

CONTRIBUTION TO THE THEORY OF ELECTRICAL CHARGING OF AN AEROSOL.
APTIC-25980 06

ELECTRODYNAMIC BEHAVIOR OF CHARGED AEROSOL PARTICLES IN AN INHOMOGENEOUS ALTERNATING FIELD AND POSSIBILITIES OF ITS APPLICATION IN DUST ENGINEERING.
APTIC-26041 06

THE IONS OF THE TROPOSPHERE THEIR INTERACTIONS WITH AEROSOLS AND THE GEOELECTRIC FIELD.
APTIC-26080 05

COLLISION RATES BETWEEN GAS MOLECULES AND AEROSOL PARTICLES.
APTIC-26228 05

AFRICA
ATMOSPHERIC DUSTS COLLECTED OFF THE WEST AFRICAN COAST.
APTIC-26016 04

AFTERBURNERS
AFTERBURNER FOR AN INTERNAL COMBUSTION ENGINE.
APTIC-25728 02

AIR BLOWING
AIR BLOWING.
APTIC-24723 01

AIR CONDITIONING EQUIPMENT
THE USE OF ELECTROFILTERS IN AIR CONDITIONING.
APTIC-24847 02

TRIBUTARY VENTILATION WITH A FOAM FILTER.
APTIC-24887 02

SEPARATION EFFICIENCY OF ROOM AIR STERILIZATION EQUIPMENT COMPARED WITH DUST PARTICLES OF DIFFERENT SIZES.
APTIC-25568 02

ELECTROSTATIC CONDITIONING ARRANGEMENT.
APTIC-25711 02

THE STUDY OF MAINTENANCE OF AIR-CLEANING DEVICES AS AIR POLLUTION CONTROL MEASURE.
APTIC-25880 02

MAINTENANCE AND MANAGEMENT OF AIR-CLEANING DEVICES IN OFFICE BUILDINGS.
APTIC-25915 02

AIR POLLUTION EPISODES
FLUORINE GASES IN ATMOSPHERE AS INDUSTRIAL WASTE BLAMED FOR DEATH AND CHRONIC POISONING OF DONORA AND WEBSTER, PA., INHABITANTS.
APTIC-24580 07

AIR POLLUTION CONTROL HEALTH ASPECTS AND MICROTECHNIQUES.
APTIC-24603 03

ASSOCIATED HEALTH IMPLICATIONS IN AIR-POLLUTION CONTROL.
APTIC-24910 07

INTERMITTENT AIR POLLUTION EPISODE IN NEW YORK CITY, 1962.
APTIC-25829 07

AREA METEOROLOGY.
APTIC-25855 05

AIR POLLUTION FORECASTING
THE NATIONAL AIR POLLUTION POTENTIAL FORECAST PROGRAM.
APTIC-23790 05

ENVIRONMENTAL SIMULATION IN AIR POLLUTION CONTROL.
APTIC-25762 05

EXPERIMENTAL AIR QUALITY FORECASTS IN THE SACRAMENTO VALLEY.
APTIC-26088 05

INTERMEDIATE REPORT OF STUDY ON AIR POLLUTION CAUSED BY AUTOMOBILE EXHAUST GAS.
APTIC-26102 05

AIR POLLUTION POTENTIAL OVER THE SALT LAKE VALLEY OF UTAH AS RELATED TO STABILITY AND WIND SPEED.
APTIC-26264 05

FORECASTING COH LEVELS AT SIX OUTLYING SAMPLING STATIONS IN ALLEGHENY COUNTY USING STATISTICAL CORRELATIONS DERIVED FROM THE DOWNTOWN STATION.
APTIC-26280 05

AIR QATY STANDARD
REQUESTS AND OPINIONS CONCERNING THE ADMINISTRATION OF THE ENVIRONMENTAL STANDARD FOR SULFUR OXIDES.
APTIC-26111 12

AIR QUALITY CONTROL REGION
A SUGGESTED PROGRAM FOR THE SACRAMENTO REGION.
APTIC-24059 12

AIR QUALITY CONTROL REGIONS
ECONOMIC PROJECTIONS FOR AIR QUALITY CONTROL REGIONS.
APTIC-25993 10

AIR QUALITY CRITERIA
THE MEASUREMENT OF AIR POLLUTION AND THE ESTABLISHMENT OF CRITERIA FOR THE EVALUATION OF AIR QUALITY.
APTIC-24907 11

ATTEMPT TO DEFINE THE EXPOSURE LIMITS OF CONCENTRATION FOR SO2, CL2, H2S, AND THE NITROGEN OXIDES IN AN URBAN ATMOSPHERE.
APTIC-24941 11

CONSIDERATIONS IN DEVELOPING AIR QUALITY CRITERIA.
APTIC-25575 11

INORGANIC FLUORIDES.
APTIC-25933 11

AIR QUALITY MEASUREMENT PROGRAMS
THE NEW YORK STATE CONTINUOUS AIR QUALITY MONITORING SYSTEM.
APTIC-23762 03

THE IMPORTANCE OF INVESTIGATING GLOBAL BACKGROUND POLLUTION.
APTIC-23959 04

THE 1968 ANNUAL REPORT OF THE STATE INSTITUTE FOR IMMISSION AND SOIL PROTECTION OF THE STATE OF NORDRHEIN-WESTFALEN IN ESSEN.
APTIC-24612 12

ONTARIO'S AIR POLLUTION INDEX.
APTIC-24635 04

ATMOSPHERIC POLLUTION IN THE USA EXPERIENCES GAINED DURING A STUDY TOUR. TECHNICAL ASPECTS.
APTIC-24639 03

MONITORING OF FLUORIDE CONTENT OF AIR, WATER, AND VEGETATION.
APTIC-24801 04

PROTECTION OF ENVIRONMENT.
APTIC-25593 04

ANALYTICAL INSTRUMENTATION FOR MONITORING AIR AND WATER POLLUTION.
APTIC-26189 03

EVALUATION OF AIR POLLUTION IN THE VALLE DE MEXICO.
APTIC-26297 04

AIR QUALITY MEASUREMENTS
INTERSTATE EFFECTS SURVEILLANCE NETWORK. 1969 DATA.
APTIC-22703 04

THE 1968 ANNUAL REPORT OF THE STATE INSTITUTE FOR IMMISSION AND SOIL PROTECTION OF THE STATE OF NORDRHEIN-WESTFALEN IN ESSEN.
APTIC-24612 12

MEASUREMENT OF ATMOSPHERIC FLUORINE. ANALYSES OF RAIN WATERS AND SPANISH MOSS EXPOSURES.
APTIC-24717 04

AIR BLOWING.
APTIC-24723 01

FLUORIDE CONCENTRATIONS IN THE AMBIENT AIR.
APTIC-24736 04

PRINCIPAL AGENTS OF POLLUTION AND THEIR RATE OF DISPERSAL.
APTIC-24776 04

AIR POLLUTION IN KAWASAKI.
APTIC-24789 04

NITROGEN DIOXIDE IMMISSIONS IN SOME SELECTED DISTRICTS OF THE STATE OF NORDRHEIN-WESTFALEN.
APTIC-24807 04

DETERMINATION OF SMALL AMOUNTS OF SULFURIC ACID IN THE ATMOSPHERE.
APTIC-24874 04

MONITORING OF SO2 IN THE VICINITY OF COAL-FIRED POWER PLANTS -TVA EXPERIENCES.
APTIC-24913 04

EFFECT OF THE FEBRUARY 1959 FOGS ON THE POLYCYCLIC HYDROCARBON CONCENTRATION OF THE ATMOSPHERE OF THE LIEGE AREA.
APTIC-24923 04

A STUDY OF ATMOSPHERIC POLLUTION.
APTIC-24945 04

APTIC-24945 04

LEAD IN A SUBURBAN ENVIRONMENT.
APTIC-24952 04

BENZPYRENE CONTENT OF DUST SAMPLES COLLECTED ON URBAN AND RURAL SETTLEMENTS AND IN INDUSTRIAL PLANTS 3,4.
APTIC-25565 04

PROTECTION OF ENVIRONMENT.
APTIC-25593 04

LEADED PARTICLES IN URBAN AREAS.
APTIC-25635 04

STATISTICAL REPORT OF AEROALLERGENS (POLLENS AND MOLDS) FORT HUACHUCA, ARIZONA 1969.
APTIC-25679 04

POLYNUCLEAR AROMATIC HYDROCARBON COMPOSITION OF THE ATMOSPHERE IN SOME LARGE AMERICAN CITIES.
APTIC-25693 04

RELATIONSHIP BETWEEN AIR POLLUTION AND ASTHMATIC DISEASES AMONG PRIMARY SCHOOL CHILDREN IN KITA-KYUSHU. PART I. STATISTICAL ANALYSIS BASED ON QUESTIONNAIRES.
APTIC-25739 07

GAMMA RAY SPECTROMETRY OF THE NATURAL RADIOACTIVITY IN THE AIRBORNE DUST.
APTIC-25758 04

THE AIR OF ANCHORAGE--TODAY AND TOMORROW.
APTIC-25770 04

AIR POLLUTION LEVELS ASSOCIATED WITH A 49-HR INVERSION AT DETROIT-WINDSOR.
APTIC-25784 04

CARBON MONOXIDE IN TOWN AIR AN INTERIM REPORT.
APTIC-25799 04

CONTINUOUS AIR MONITORING PROJECTS 1968 DATA TABULATIONS AND SUMMARIES, CHICAGO.
APTIC-25803 04

CONTINUOUS AIR MONITORING PROJECTS 1968 DATA TABULATIONS AND SUMMARIES, PHILADELPHIA.
APTIC-25804 04

CONTINUES AIR MONITORING PROJECTS 1968 DATA TABULATIONS AND SUMMARIES, CINCINNATI.
APTIC-25817 04

ATMOSPHERIC REACTION STUDIES IN THE LOS ANGELES BASIN. VOLUME I. PROGRAM DESIGN AND METHODOLOGY DATA SUMMARY AND DISCUSSION. 1969. (FINAL REPORT).
APTIC-25837 04

ATMOSPHERIC REACTION STUDIES IN THE LOS ANGELES BASIN. VOLUME II. COMMERCE GROUND DATA. 1969. (FINAL REPORT).
APTIC-25856 04

ATMOSPHERIC REACTION STUDIES IN THE LOS ANGELES BASIN. VOLUME III. EL MONTE GROUND DATA. 1969. (FINAL REPORT).
APTIC-25857 04

FIRST OBSERVATIONS ABOUT ATMOSPHERIC ALLERGIC FUNGI IN SOUTHERN AND EASTERN BELGIUM.
APTIC-25876 04

HORIZONTAL AND VERTICAL DISTRIBUTION OF LEAD PARTICULATES IN AIR AROUND A BUSY ROAD IN YOKOHAMA CITY.
APTIC-25881 04

CONTINUOUS AIR MONITORING PROJECTS 1968 DATA TABULATIONS AND SUMMARIES, ST. LOUIS.
APTIC-25992 04

ATMOSPHERIC REACTION STUDIES IN THE LOS ANGELES BASIN. (FINAL REPORT).
APTIC-25994 04

AIR POLLUTION BY CARBON MONOXIDE AT BORDEAUX.
APTIC-26013 04

ATMOSPHERIC DUSTS COLLECTED OFF THE WEST AFRICAN COAST.
APTIC-26016 04

REPORT ON AIR POLLUTION STUDY, NAOETSU REGION.
APTIC-26026 04

REPORT ON AIR POLLUTION STUDY (NO. 4).
APTIC-26027 04

RESEARCH ON THE ACTUAL CONDITION OF AIR POLLUTION. 3. DEGREE OF AIR POLLUTION IN KANAGAWA PREFECTURE. (MEASURED BY ALKALINE PAPER FILTRATION METHODS).
APTIC-26030 04

REPORT ON THE STUDY OF AIR POLLUTION IN NISHIYODOGAWA WARD.
APTIC-26031 04

PRELIMINARY SURVEY OF THE AIR POLLUTION IN TOKUSHIMA PREFECTURE, PART VII.
APTIC-26036 04

DUST AND SOOT NUISANCES AT A METALLURGICAL COKING PLANT AND IN ITS ENVIRONMENT.
APTIC-26040 01

AN OUTLINE OF THE RESULTS OF AIR POLLUTION MEASUREMENTS IN THREE PLACES IN TOKYO.
APTIC-26042 04

STUDIES ON AIR POLLUTION OF NEW DEVELOPING INDUSTPIAL CITY MIZUSHIMA, OKAYAMA PREFECTURE.
APTIC-26043 04

THE INVESTIGATION OF THE ACTUAL CONDITION OF AIR POLLUTION. 1.1 AIR POLLUTION IN THE KEIHIN INDUSTRIAL DISTRICTS.
APTIC-26044 04

ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE (I).
APTIC-26045 04

DEGREE OF AIR POLLUTION IN KANAGAWA PREFECTURE.
APTIC-26052 04

REPORT OF THE SURVEY OF AIR POLLUTION OF ANNAKA AREA IN GUNMA PREFECTURE.
APTIC-26054 04

HYGIENIC STUDIES OF THE ATMOSPHERE IN SETTLEMENTS OF THE ZURICH REGION.
APTIC-26081 04

AIR POLLUTION SMOKE AND SO2.
APTIC-26094 04

STUDIES ON REGIONAL REPRESENTATIVE VALUE OF AIR POLLUTANT.
APTIC-26131 04

ATMOSPHERIC OZONE CONCENTRATION AT GROUND LEVEL, PORT AUX FRANCAIS STATION (KERGUELEN ISLANDS).
APTIC-26151 04

AN ARTICLL DEALING WITH SULFUR DIOXIDE EMISSIONS AND THEIR EFFECTS ON VEGETATION.
APTIC-26174 04

AIR POLLUTION AND ASSOCIATED HEALTH HAZARDS FROM DIESEL LOCOMOTIVE TRAFFIC IN A RAILWAY TUNNEL.
APTIC-26262 01

ENVIRONMENT IN YAMAGUCHI PREFECTURE.
APTIC-26281 04

ON THE TYPE OF AIR POLLUTION OF MIZUSHIMA, OKAYAMA PREFECTURE.
APTIC-26282 04

RESEARCHES ON AUTO EXHAUST GAS POLLUTION AND TRAFFIC NOISES IN TOKUSHIMA CITY. PART I.
APTIC-26284 04

'THE WEEK OF DRUG AND HEALTH' IN 1969. REPORT ON THE INVESTIGATION OF PUBLIC NUISANCE BY TRAFFIC IN BIG CITIES IN JAPAN.
APTIC-26286 04

RESEARCH ON THE ACTUAL CONDITION OF AIR POLLUTION. 4. INVESTIGATION OF AIR POLLUTION CAUSED BY AUTOMOBILE WASTE GASES IN THE SEISHO NATIONAL HIGHWAY.
APTIC-26287 04

ON AIR POLLUTION OF MITSUISHI-TOWN, BIZEN-TOWN AND TAMANO-CITY, OKAYAMA PREFECTURE.
APTIC-26288 04

STUDIES ON PUBLIC NUISANCE CAUSED BY AIR POLLUTION. 2. AIR POLLUTION IN TAJIMI CITY.
APTIC-26289 04

AIR POLLUTION.
APTIC-26290 04

APTIC-26293 04

ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE. (II).
APTIC-26302 04

A TENTATIVE PLAN CONCERNING A COMPREHENSIVE ASSESSMENT OF ENVIRONMENTAL POLLUTION.
APTIC-26304 04

STUDIES ON AIRBORNE FUNGAL FLORA. PART II. STUDY ON AIRBORNE FUNGI IN REFERENCE TO ATMOSPHERIC FACTORS AND AIR POLLUTION.
APTIC-26307 04

AN INTERIM REPORT ON THE INVESTIGATION OF PUBLIC NUISANCE BY LEAD.
APTIC-26310 04

ATMOSPHERIC POLLUTANTS RESULTS TO DATE OF STUDIES CONDUCTED IN THE CITY OF BUENOS AIRES.
APTIC-26311 04

AIR QUALITY MEASUREMENTS
CONTINUOUS AIR MONITORING PROJECTS 1967 DATA TABULATIONS AND SUMMARIES, DENVER.
APTIC-25805 04

AIR QUALITY STANDARDS
GUIDELINES FOR THE DEVELOPMENT OF AIR QUALITY STANDARDS AND IMPLEMENTATION PLANS.
APTIC-12494 12

AIR SEPARATION PLANTS
SAFETY IN AIR SEPARATION PLANTS DETERMINATION OF ATMOSPHERIC POLLUTANTS BY GAS CHROMATOGRAPHY.
APTIC-24592 03

AIRCRAFT
AIRCRAFT GAS TURBINE ENGINE EXHAUST SMOKE MEASUREMENT.
APTIC-24581 03

AIR-FUEL RATIO
EXHAUST GAS PURIFICATION DEVICE FOR AUTOMOTIVE INTERNAL COMBUSTION ENGINE.
APTIC-24823 02

APPARATUS FOR REDUCING HYDROCARBON CONTENT OF ENGINE EXHAUST GASES DURING DECELERATION OF AUTOMOBILE.
APTIC-25540 02

AITKEN COUNTERS
THE CONDENSATION NUCLEI COUNTER AS AN AIR POLLUTION WEAPON.
APTIC-24634 03

AKITA
REPORT ON AIR POLLUTION STUDY (NO. 4).
APTIC-26027 04

ALCOHOLS
DETECTIONS OF ALCOHOLS IN GAS ATMOSPHERES.
APTIC-25666 03

ALDEHYDES
ON THE STABILITY OF ACROLEIN TOWARDS PHOTO-OXIDATION IN THE NEAR ULTRAVIOLET.
APTIC-25630 05

ALERTS
SOME EXAMPLES OF WIDE-AREA AIR POLLUTION IN LATE SPRING.
APTIC-24685 04

ENVIRONMENTAL SIMULATION IN AIR POLLUTION CONTROL.
APTIC-25762 05

ALFALFA
EFFECT OF COLD STORAGE ON THE FLUORIDE CONTENT OF ALFALFA.
APTIC-24886 03

ALIPHATIC HYDROCARBONS
TOXICOLOGIC ASPECTS OF FLAMMABILITY AND COMBUSTION OF POLYMERIC MATERIALS.
APTIC-24153 07

A METHOD OF OXIDIZING HYDROGEN SULFIDE TO ELEMENTARY SULFUR.
APTIC-24752 02

ULTRAVIOLET ABSORPTION OF ALIPHATIC NITRO COMPOUNDS IN THE PRESENCE OF A BASE.
APTIC-25948 03

ALKALINE ADDITIVES
EXPERIENCES WITH THE USE OF LIME IN FLUE GAS DESULFURIZATION.
APTIC-24613 02

THERMODYNAMIC ANALYSIS OF THE REDUCTION OF SULFUR DIOXIDE BY METAL SULFIDES WITH THE FORMATION OF ELEMENTAL SULFUR.
APTIC-24703 06

A PROCESS FOR THE REMOVAL OF SULFUR COMPOUNDS FROM HOT CRACKING GAS.
APTIC-24769 02

A REACTION WHICH PERMITS THE CYCLIC USE OF CALCINED DOLOMITE TO DESULFURIZE FUELS UNDERGOING GASIFICATION.
APTIC-24762 02

PROCEDURE FOR EXTRACTING AND CONCENTRATING SULFUROUS GASES.
APTIC-24778 02

DISTRIBUTION OF CARBON DIOXIDE AND SULFUR CONTAINING IMPURITIES IN THE GAS DISTRIBUTION STREAM.
APTIC-25547 02

SULFUR EXTRACTION USING TRICHLOROETHYLENE IN PRESENCE OF LIMESTONE, TRONA, AND SODA ASH.
APTIC-25552 02

METHOD AND APPARATUS FOR MINIMIZING AIR POLLUTION.
APTIC-25602 02

METHOD AND DEVICE FOR THE DESULFURIZATION OF GASES, ESPECIALLY FLUE GASES AND OTHER WASTE GASES.
APTIC-25838 02

PREPARATION OF SULFUR BY THE INTERACTION OF SULFUR DIOXIDE CONTAINING GASES WITH HEATED CARBON IN THE PRESENCE OF METAL COMPOUNDS.
APTIC-26165 02

POWER AND INDUSTRY CONTROL OF SULFUR DIOXIDE EMISSIONS.
APTIC-26230 02

A PROCESS FOR REMOVING SULPHUR DIOXIDE FROM WASTE GASES.
APTIC-26246 02

ALKALIZED ALUMINA (ADSORPTION)
AIR POLLUTANT REMOVAL APPARATUS HAVING HORIZONTAL BED FOR AIR-LIQUID CONTACT.
APTIC-25885 02

SIMULTANEOUS SO2 AND FLY ASH REMOVAL.
APTIC-26073 02

ALLEGHENY COUNTY
ANALYTICAL INSTRUMENTATION FOR MONITORING AIR AND WATER POLLUTION.
APTIC-26189 03

ALLEGIES
TOBACCO AND THE NONSMOKER. A STUDY OF SUBJECTIVE SYMPTOMS.
APTIC-24893 07

ALLERGIES
TOBACCO AND THE NONSMOKER. A STUDY OF SUBJECTIVE SYMPTOMS.
APTIC-24893 07

STUDIES ON MASS EXAMINATION BY INTRADERMAL REACTION AGAINST HOUSE DUST EXTRACT AMONG SCHOOL CHILDREN IN THE AIR POLLUTED AND UNPOLLUTED AREA. REPORT VI. RELATIONS BETWEEN THE INTRADERMAL REACTION AND INFLUENCES OF AIR POLLUTION ON THE HUMAN BODY.
APTIC-26004 07

ALPHA PARTICLES
SURFACE COLLECTION EFFICIENCY OF LARGE-PORE MEMBRANE FILTERS.
APTIC-22169 03

ALTITUDE
ON INCREASED CHIMNEY HEIGHT.
APTIC-24585 05

ON THE ORIGIN OF ICE NUCLEI.
APTIC-24926 05

ATMOSPHERIC OZONE.
APTIC-24929 03

APTIC-24929 03

THE USE OF RADIOACTIVE TRACERS IN QUANTITATIVE STUDIES OF MOVEMENTS OF THE ATMOSPHERE.
APTIC-25842 05

OXYGEN-18 VARIATIONS IN ATMOSPHERIC CARBON DIOXIDE THE HASL DATA.
APTIC-26077 05

ALUMINUM
CORROSION PRODUCTS IN VARIOUS ENVIRONMENTS.
APTIC-25727 09

PRESENT SITUATION AND OUTLOOK OF FLUORIDES AIR POLLUTION PREVENTION TECHNOLOGY--TACKLING WITH ALUMINUM SMELTING POLLUTION.
APTIC-26136 01

GAS SCRUBBING IN THE HYDRODYNAMIC DUST SEPARATOR DURING ELECTROLYSIS OF ALUMINUM.
APTIC-26279 02

ALUMINUM COMPOUNDS
ATOMIC ABSORPTION SPECTROSCOPY OF ALUMINUM.
APTIC-26098 03

AIR POLLUTION FROM FLUORIDES.
APTIC-26258 01

ALUMINUM OXIDES
METHOD FOR THE PREPARATION OF A CATALYST FOR THE CONVERSION OF H2S AND/OR SO2 TO ELEMENTARY SULFUR.
APTIC-24936 02

RESULTS OBTAINED WITH A NEW METHOD OF DETERMINATION OF THE

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED DUST.
APTIC-25872 03

AMINES
ELECTRONIC ABSORPTION SPECTRA OF INORGANIC AND ORGANIC COMPOUNDS OF NITROGEN. I. NITROGEN DIOXIDE-DINITROGEN TETROXIDE IN SOLUTION.
APTIC-26253 06

AMMONIA
AMMONIA PROCESS FOR REMOVAL OF SULFUR DIOXIDE FROM FLUE GAS.
APTIC-24763 02

DISTURBANCE OF ACID-BASE AND ENZYME EQUILIBRIUM IN EXPERIMENTAL INTOXICATION WITH SO2 AND PROTECTIVE ACTION OF AMMONIA.
APTIC-26138 07

AMMONIUM COMPOUNDS
WASTE GYPSUM INTO USEFUL PRODUCTS.
APTIC-24646 02

STUDIES ON THE REMOVAL OF SULFUR DIOXIDE FROM HOT FLUE GASES AS A MEASURE TO PREVENT AIR POLLUTION IV. RECOVERY OF FLUE GAS SULFUR AS AMMONIUM PHOSPHATE.
APTIC-24844 02

PH VALUE OF AMMONIUM SULFITE-BISULFITE SOLUTIONS.
APTIC-24895 02

ANALYTICAL METHODS
AIR POLLUTION INSTRUMENTATION. STATE OF THE ART.
APTIC-12596 03

AUTOMATIC ANALYSIS OF GASEOUS IMPURITIES IN THE ATMOSPHERE.
APTIC-22220 03

LITERATURE REVIEW OF METROPOLITAN AIR POLLUTANT CONCENTRATIONS--PREPARATION, SAMPLING AND ASSAY OF SYNTHETIC ATMOSPHERES. (FINAL REPORT).
APTIC-22812 03

AIR POLLUTION CONTROL HEALTH ASPECTS AND MICROTECHNIQUES.
APTIC-24603 03

MEASURING METHOD OF AIR POLLUTANTS DUE TO AUTOMOBILE EXHAUST.
APTIC-24644 03

MEASURING GASEOUS EMISSIONS FROM AN AIRCRAFT TURBINE ENGINE.
APTIC-24745 03

INSTRUMENTATION AND ANALYTICAL TECHNIQUES FOR THE CONTINUOUS DETERMINATION OF AIR CONTAMINANTS.
APTIC-24927 03

MODERN METHODS OF MONITORING GASEOUS PULP MILL EFFLUENTS FOR SULFUR COMPOUNDS.
APTIC-24939 03

VOLATILE TOXIC COMPOUNDS.
APTIC-25598 03

METHODS OF FLUORINE AND FLUORIDE ANALYSIS - I.
APTIC-25615 03

METHODS OF FLUORINE AND FLUORIDE ANALYSIS - II.
APTIC-25616 03

METHODS OF FLUORINE AND FLUORIDE ANALYSIS - III.
APTIC-25617 03

STUDY OF LONG-TERM ATMOSPHERIC TRACE CONTAMINANT MONITORING AND CONTROL. (FINAL REPORT).
APTIC-25686 03

FURTHER APPLICATIONS OF THE LINED FILTER PAPER TECHNIQUE IN FLUORINE AIR POLLUTION STUDIES.
APTIC-25816 03

IMPROVEMENT OF X-RAY SPECTROGRAPHIC ANALYSIS OF FILTRATION OF THE L LINES FROM THE PRIMARY BEAM.
APTIC-25822 03

AIR POLLUTANT ANALYSIS.
APTIC-26106 03

MEASUREMENT OF GASEOUS AIR POLLUTION.
APTIC-26122 03

ANCHORAGE
THE AIR OF ANCHORAGE--TODAY AND TOMORROW.
APTIC-25770 04

ANEMOMETERS
INVESTIGATION OF ATMOSPHERIC TURBULENCE BY MEANS OF THE M-27 BRIDLED-CUP ANEMOMETER.
APTIC-25978 05

ANIMALS
INFORMATION ON DAMAGE CAUSED BY AIR POLLUTION TO THE PLANTS AND ANIMALS IN EUROPEAN COUNTRIES.
APTIC-24933 08

THE EFFECT OF FLUORINE EXHALATION ON ANIMALS IN THE SURROUNDINGS OF AN ALUMINUM PLANT.
APTIC-25665 08

INORGANIC FLUORIDES.
APTIC-25933 11

ANTHOCYANIN
ANTHOCYANIN FORMATION AS A RESPONSE TO OZONE AND SMOG TREATMENT IN RUMEX CRISPUS L.
APTIC-24883 08

ANTHRACENES
BENZO(A)PYRENE AND BENZ(A)ANTHRACENE.
APTIC-24905 06

ANALYSIS OF POLYCYCLIC HYDROCARBONS IN PARTICULATE POLLUTANTS.
APTIC-25920 03

ANTICYCLONES
AREA METEOROLOGY.
APTIC-25855 05

AREA SURVEYS
REPORT FOR CONSULTATION ON THE METROPOLITAN PROVIDENCE INTERSTATE AIR QUALITY CONTROL REGION (RHODE ISLAND-MASSACHUSETTS).
APTIC-12569 12

AIR POLLUTION IN CALVERT COUNTY, MARYLAND.
APTIC-12832 01

AIR POLLUTION IN ST. MARY'S COUNTY, MARYLAND.
APTIC-12833 01

AIR POLLUTION IN WORCESTER COUNTY MARYLAND.
APTIC-12834 01

REGIONAL DIFFERENCES IN THE DEPOSITION OF HEAVY METALS OVER SCANDINAVIA.
APTIC-23971 04

THE USE OF SNOW SAMPLES IN AIR POLLUTION STUDIES.
APTIC-24740 03

NATIONAL SURVEY OF THE ODOR PROBLEM. PHASE I OF A STUDY OF THE SOCIAL AND ECONOMIC IMPACT OF ODORS APPENDIX.
APTIC-24768 13

NITROGEN DIOXIDE IMMISSIONS IN SOME SELECTED DISTRICTS OF THE STATE OF NORDRHEIN-WESTFALEN.
APTIC-24807 04

RECOMMENDATIONS AND SUMMARY OF PARKERSBURG, W. VA.-MARIETTA, OHIO, INTERSTATE AIR POLLUTION ABATEMENT CONFERENCE.
APTIC-24858 12

PARKERSBURG, WEST VIRGINIA--MARIETTA, OHIO, AIR POLLUTION ABATEMENT ACTIVITY SUPPLEMENTAL TECHNICAL REPORT.
APTIC-25780 04

KANAWHA VALLEY AIR POLLUTION STUDY.
APTIC-25996 04

CHATTANOOGA, TENNESSEE -- ROSSVILLE, GEORGIA INTERSTATE AIR QUALITY STUDY 1967-1968.
APTIC-26086 04

AROMATIC HYDROCARBONS
MECHANISM OF TOXIC VAPOUR UPTAKE BY LUNG. I. EXPERIMENTAL APPARATURE RECORDING ORGANIC VAPOUR CONCENTRATIONS IN EXPIRED AIR.
APTIC-24648 07

FOOD IN A CARCINOGENIC ENVIRONMENT.
APTIC-25704 07

ARSENIC COMPOUNDS
DETERMINATION OF ARSENIC IN THE ATMOSPHERE.
APTIC-25861 03

ASBESTOS
STUDIES OF THE MODE OF ACTION OF ASBESTOS AS A CARCINOGEN.
APTIC-24925 07

WIDENING SPECTRUM OF ASBESTOS DISEASE.
APTIC-24934 07

OVARIAN CANCER AND ASBESTOS.
APTIC-24942 07

THE DETERMINATION OF CHRYSOTILE IN AIRBORNE ASBESTOS.
APTIC-25656 03

ASBESTOS PLEURISY.
APTIC-25844 07

ASBESTOSIS
PLEURAL CALCIFICATION AS A ROENTGENOLOGIC SIGN OF NON-OCCUPATIONAL ENDEMIC ANTHOPHYLLITE-ASBESTOSIS.
APTIC-22195 07

WIDENING SPECTRUM OF ASBESTOS DISEASE.
APTIC-24934 07

ASIA
FOREIGN PROFILES IN AIR POLLUTION CONTROL ACTIVITIES SPECIAL SOURCES OF INFORMATION.
APTIC-26168 12

ASPHALT
GASIFICATION PROCESS USING ASPHALT AS RAW MATERIAL.
APTIC-26011 02

ASPIRATORS
COLLECTION OF GAS-BORNE DUST PARTICLES BY MEANS OF AN ASPIRATED SAMPLING NOZZLE.

APTIC-25957 03

METHODS OF SAMPLING SUSPENDED DUST FOR MEASURING THE FREE SILICA CONTENT.
APTIC-26076 03

ASTHMA
RELATIONSHIP BETWEEN AIR POLLUTION AND ASTHMATIC DISEASES AMONG PRIMARY SCHOOL CHILDREN IN KITA-KYUSHU. PART I. STATISTICAL ANALYSIS BASED ON QUESTIONNAIRES.
APTIC-25739 07

STUDIES ON THE RELATIONSHIP BETWEEN AIR POLLUTION AND INFANTILE ASTHMA ATTACKS. USING THE SO2 CONCENTRATION IN THE AIR AS AN INDICATOR.
APTIC-26051 07

THE EFFECT OF O3, NO2, AND SO2 EXPOSURE ON THE EXPERIMENTAL ASTHMA IN GUINEAPIGS.
APTIC-26117 07

A STATISTICAL STUDY ON CHRONIC RESPIRATORY DISEASE AMONG STUDENTS OF JUNIOR HIGH SCHOOL IN ODAWARA CITY.
APTIC-26283 07

ATMOSPHERIC BOUNDARY LAYER
LABORATORY SIMULATION OF THE ATMOSPHERIC BOUNDARY LAYER.
APTIC-25981 05

ATMOSPHERIC MOVEMENTS
THE USE OF RADIOACTIVE TRACERS IN QUANTITATIVE STUDIES OF MOVEMENTS OF THE ATMOSPHERE.
APTIC-25842 05

ATMOSPHERIC PHENOMENA
SOME STATISTICAL ASPECTS OF LONG-TERM FLUCTUATIONS IN SOLAR AND ATMOSPHERIC PHENOMENA.
APTIC-24758 05

ATOMIC ABSORPTION SPECTROSCOPY
ATOMIC ABSORPTION SPECTROSCOPY OF ALUMINUM.
APTIC-26098 03

AUTOMATIC METHODS
PROBLEMS IN THE GRAVIMETRIC MEASUREMENT OF RESPIRABLE COAL MINE DUST.
APTIC-24656 03

ATMOSPHERE SAMPLING DEVICE.
APTIC-25712 03

SOPHISTICATED SYSTEMS REQUIRED TO MONITOR HEAVIER POLLUTION.
APTIC-26256 03

AUTOMOBILES
DISCUSSION OF 'A STATISTICAL APPROACH TO DESCRIBING VEHICULAR DRIVING CYCLES'. F. BECKLEY SMITH, JR., W. A. P. MEYER, AND R. U. AYRES, SAE PAPER NO. 690212.
APTIC-12771 06

THE SHARE OF AUTOMOBILE EXHAUST GASES IN AIR POLLUTION.
APTIC-24783 01

EXHAUST EMISSIONS FROM SEVEN LP GAS POWERED VEHICLES.
APTIC-25678 02

ELECTROSTATIC CONDITIONING ARRANGEMENT.
APTIC-25711 02

AN ANALYSIS OF THE DRIVING PATTERN IN THE METROPOLITAN AREA. PART II.
APTIC-25725 01

AN ANALYSIS OF THE DRIVING PATTERN IN METROPOLITAN AREA. PART I.
APTIC-25726 01

AUTOMOTIVE STARTING AND WARM-UP RESPOND TO GASOLINE VOLATILITY.
APTIC-25931 01

LUCAS BACK THE ZINC-AIR BATTERY.
APTIC-26140 02

AUTOMOTIVE EMISSION CONTROL
AUTOMOTIVE AIR POLLUTION CONTROL.
APTIC-23369 02

AUTOMOTIVE POLLUTION CONTROL.
APTIC-23390 12

EVAPORATIVE EMISSIONS CONTROLS IMPROVED IN '71 MODELS.
APTIC-24625 02

SUMMARY OF STATEMENT OF JOHN O. LOGAN AND C. G. GERHOLD OF UNIVERSAL OIL PRODUCTS CO., DES PLAINES, ILL., WASHINGTON, D. C., MARCH 20, 1970.
APTIC-24696 02

EXHAUST MANIFOLD THERMAL REACTORS - A SOLUTION TO THE AUTOMOTIVE EMISSIONS PROBLEM.
APTIC-24722 02

METAL HYDRIDES AS A SOURCE OF FUEL FOR VEHICULAR PROPULSION.
APTIC-24746 02

EMISSION AND PERFORMANCE OF GASOLINE ENGINE.
APTIC-24813 01

ENGINE EXHAUST GAS PURIFICATION DEVICE.
APTIC-24822 02

CATALYST FOR ENGINE EXHAUST-GAS REFORMATION.
APTIC-25553 02

AIR POLLUTION CONTROL DEVICE FOR ENGINES.
APTIC-25566 02

CONTROL OF AUTOMOBILE EMISSIONS- CALIFORNIA EXPERIENCE AND THE FEDERAL LEGISLATION.
APTIC-255[illegible]1 12

EXHAUST GAS WASHING APPARATUS.
APTIC-25715 02

DEVICE FOR REDUCING THE CONTENT OF CARBON MONOXIDE IN THE EXHAUST GASES FROM AN INTERNAL COMBUSTION ENGINE.
APTIC-25737 02

A SUGGESTED PROGRAM FOR GOVERNMENT AND INDUSTRY IN SOLVING THE AUTOMOTIVE EMISSIONS PROBLEM.
APTIC-25757 02

AIR POLLUTION FROM MOTOR VEHICLES.
APTIC-25886 02

CONTROL TECHNIQUE OF MOBILE EXHAUST EMISSION.
APTIC-25894 02

THE EXHAUST EMISSION CONTROL SYSTEM FOR ROTARY ENGINES.
APTIC-26008 02

REMOVAL OF LEAD FROM AUTOMOBILE EXHAUSTS BY MOLTEN SALTS.
APTIC-26064 02

SYMPOSIUM RECENT PROBLEMS ON AUTOMOTIVE FUELS.
APTIC-26134 02

HYDROCARBON CONTROL FOR LOS ANGELES BY REDUCING GASOLINE VOLATILITY.
APTIC-26199 02

IMPROVED PROCEDURE FOR PURIFYING THE EXHAUST OF INTERNAL COMBUSTION MOTORS.
APTIC-26243 02

AUTOMOTIVE EMISSIONS
EMISSION AND PERFORMANCE OF GASOLINE ENGINE.
APTIC-24813 01

LEADED OR NON-LEADED GASOLINE...WHAT ARE THE FACTS
APTIC-24829 02

SUMMARIES OF LITERATURE RELATED TO AIR POLLUTION.
APTIC-24918 07

EFFECT OF AUTOMOBILE EXHAUST ON CELL GROWTH IN VITRO.
APTIC-25604 03

CONTROL DEVICES.
APTIC-25632 02

THE AIR POLLUTION RESEARCH PROGRAM OF THE COORDINATING RESEARCH COUNCIL.
APTIC-25965 12

AUTOMOTIVE ENGINE DESIGNING AND GASOLINE.
APTIC-26038 01

STATE OF AFFAIRS AND PROBLEMS INVOLVING AUTOMOTIVE FUEL GASOLINE.
APTIC-26100 01

EFFECTS OF GASOLINE ADDITIVES ON CARBURETOR AND PCV SYSTEMS PERFORMANCE AS THEY RELATE TO EXHAUST EMISSIONS.
APTIC-26200 02

ALDEHYDES, POLYNUCLEAR AROMATIC HYDROCARBONS, AND ATMOSPHERIC LEAD.
APTIC-26269 02

RESEARCH ON THE ACTUAL CONDITION OF AIR POLLUTION. 4. INVESTIGATION OF AIR POLLUTION CAUSED BY AUTOMOBILE WASTE GASES IN THE SEISHO NATIONAL HIGHWAY.
APTIC-26287 04

AZOLES
COMPLEX FORMATION OF IMIDAZOLE AND PYRROLE IN AQUEOUS PHASE AND PREFERENTIAL FIXATION OF 3,4-BENZOPYRENE BY THE MEDIUM.
APTIC-25746 06

BACK PRESSURE
EXHAUST BACK PRESSURE CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE.
APTIC-23821 02

BACTERIA
THE OPTIMAL NUTRITION MEDIUM OF MYCELIAL BIOMASS IN THE ANALYSIS OF BACTERIAL AIR POLLUTION.
APTIC-24838 03

MICROBIAL REMOVAL OF SULFIDE CONTAINED IN PETROLEUM.
APTIC-25101 02

TOXICITY OF OPEN AIR TO A VARIETY OF MICROOGANISMS.
APTIC-25698 08

THE DYNAMIC BEHAVIOR OF AEROSOLS.
APTIC-25779 06

HOSPITAL INFECTION.
APTIC-25890 01

  CONCERN TO INFLUENCE OF AERIAL BACTERIUM, ESPECIAL, ABOUT PATHOGENIC STAPHYLOCOCCUS E.
  APTIC-26012 01

  THE EFFECT OF OZONE IN THE ANTI-BACTERIAL DEFENSE MECHANISMS OF THE MURINE LUNG.
  APTIC-26249 07

BAFFLES
  AIR POLLUTION CONTROL DEVICE FOR ENGINES.
  APTIC-25566 02

BAG FILTERS
  FINE FILTRATION OF PROCESS AND WASTE GASES FROM LEAD PRODUCTION WITH THE AID OF JET BLAST BAG FILTERS.
  APTIC-24771 02

  SMOG CONTROL HELPS BAG MORE PROFITS.
  APTIC-24782 02

  APTIC-24782 02

  PLANT SERVICES BEAT EXPLOSION HAZARDS.
  APTIC-24810 02

  MODERN AUTOMATIC BAGHOUSES FOR COLLECTION OF LEAD-FURNACE FUMES.
  APTIC-25781 02

  FEASIBILITY OF FABRIC FILTER AS GAS-SOLID CONTACTOR TO CONTROL GASEOUS POLLUTANTS. (FINAL REPORT).
  APTIC-25785 02

  DEVICE FOR FILTERING SOLIDS FROM A GAS.
  APTIC-25908 02

  GAS FILTER BAG STRUCTURE.
  APTIC-25909 02

BALLOONS
  REAL TIME SIMULATION OF ATMOSPHERIC BALLOON ENVIRONMENT.
  APTIC-25823 05

BARBADOS
  DUST IN THE CARIBBEAN ATMOSPHERE TRACED TO AN AFRICAN DUST STORM.
  APTIC-24632 05

BARLEY
  ON THE INTERCELLULAR NITRATE IN THE LEAVES AND ROOTS OF BARLEY.
  APTIC-24850 08

BEHAVIOR
  HUMAN BEHAVIOR AND ATMOSPHERIC IONS.
  APTIC-26149 07

BEHAVIORAL EFFECTS
  PSYCHOLOGICAL AND BEHAVIORAL EFFECTS.
  APTIC-26156 07

BEHAVIORAL TASK
  STUDIES ON THE COMBINED EFFECTS OF OZONE AND A HOT ENVIRONMENT ON REACTION TIME IN SUBHUMAN PRIMATES.
  APTIC-25579 07

BENZENES
  EVALUATION OF THE PROCESS OF OBTAINING AROMATIC HYDROCARBONS FROM COKE-OVEN GAS.
  APTIC-24620 02

  DETERMINING THE COMPOSITION OF RAW BENZENE BY GAS-LIQUID CHROMATOGRAPHY.
  APTIC-24621 03

BENZOPYRENE
  ANALYSIS OF POLYCYCLIC HYDROCARBONS IN PARTICULATE POLLUTANTS.
  APTIC-25920 03

  STOMACH CANCER AND AIR POLLUTION AN EXPERIMENTAL STUDY IN A PETROCHEMICAL AREA.
  APTIC-26250 07

BENZOPYRENES
  INHIBITION OF CARCINOGENESIS.
  APTIC-25845 07

  INTERACTION OF BENZO(A)PYRENE (BAP) WITH MAMMALIAN CELLS IN CULTURE.
  APTIC-25850 07

BENZO(3-4)PYRENE
  BENZO(A)PYRENE AND BENZ(A)ANTHRACENE.
  APTIC-24905 06

  BENZPYRENE CONTENT OF DUST SAMPLES COLLECTED ON URBAN AND RURAL SETTLEMENTS AND IN INDUSTRIAL PLANTS 3,4.
  APTIC-25565 04

  THE ROLE OF 3 4-BENZPYRENE IN THE EPIDEMIOLOGY OF LUNG CANCER.
  APTIC-25613 07

  THE EFFECT OF AIR POLLUTANTS ON THE EYE. I. THE EFFECT OF AN ORGANIC EXTRACT ON THE CONJUNCTIVAL GOBLET CELLS.
  APTIC-25703 07

  COMPLEX FORMATION OF IMIDAZOLE AND PYRROLE IN AQUEOUS PHASE AND PREFERENTIAL FIXATION OF 3,4-BENZOPYRENE BY THE MEDIUM.
  APTIC-25746 06

  ANALYSIS OF POLYCYCLIC HYDROCARBONS IN PARTICULATE POLLUTANTS.
  APTIC-25920 03

  IDENTIFICATION OF METABOLITES OF BENZO(A)PYRENE PRODUCED BY CELLS FROM HAMSTERS SUSCEPTIBLE TO CHEMICAL CARCINOGENESIS.
  APTIC-25968 07

BERYLLIOSIS
  ANNOTATED BIBLIOGRAPHY OF LITERATURE ON BERYLLIUM.
  APTIC-12829 07

BERYLLIUM
  ANNOTATED BIBLIOGRAPHY OF LITERATURE ON BERYLLIUM.
  APTIC-12829 07

BERYLLIUM COMPOUNDS
  ANNOTATED BIBLIOGRAPHY OF LITERATURE ON BERYLLIUM.
  APTIC-12829 07

  PROCEDURE FOR EXTRACTING AND CONCENTRATING SULFUROUS GASES.
  APTIC-24778 02

  SPECIFIC SPECTROPHOTOMETRIC MICRODETERMINATION OF BERYLLIUM.
  APTIC-25919 03

  SPECTROPHOTOMETRIC DETERMINATION OF BERYLLIUM AND FLUORIDE USING CHROME AZUROL S.
  APTIC-25952 03

BESANCON
  BESANCON.
  APTIC-26225 13

BIOSPHERE
  A MODEL OF GLOBAL CLIMATE AND ECOLOGY.
  APTIC-25947 05

BIRDS
  RESPIRATORY DAMAGE DUE TO ATMOSPHERIC POLLUTANTS IN THE ENGLISH SPARROW, PASSER DOMESTICUS.
  APTIC-25577 08

BLACK LIQUOR OXIDATION
  SULPHUR COMPUNDS IN KRAFT PULP MILL EFFLUENTS.
  APTIC-24902 01

  OXIDATION OF KRAFT BLACK LIQUOR -- WHERE DOES IT STAND
  APTIC-26172 02

  RECENT DEVELOPMENTS IN BLACK LIQUOR OXIDATION.
  APTIC-26173 02

BLAST FURNACES
  CHEMICAL COMPOSITION OF FINELY-DISPERSED DUST FORMED DURING BLOWING OXYGEN THROUGH THE MELT IN THE HEARTH OF A STEEL FURNACE. 1ST COMMUNICATION.
  APTIC-26018 02

BLIND CHANGING
  BLIND CHANGING.
  APTIC-24721 01

BLOOD CELLS
  STUDIES ON HUMAN AND EXPERIMENTAL LEAD POISONING. THE INHIBITORY MECHANISM OF RED BLOOD CELL ALA-DEHYDRATASE.
  APTIC-24784 07

  CELL AND SOLUTION VELOCITY CONSTANTS FOR THE REACTION CO & HB YIELDS COHB AT DIFFERENT TEMPERATURES IN MAMMALS WITH DIFFERENT RED CELL SIZES.
  APTIC-25835 07

  THE EFFECT OF HEAT TREATMENT ON THE STRUCTURE OF KAOLIN AND ITS IN VITRO HEMOLYTIC ACTIVITY.
  APTIC-25891 07

BLOOD CHEMISTRY
  PROJECT REPORT LEAD.
  APTIC-26215 07

BLOOD GAS ANALYSIS
  SOLUBILITY OF O2 AND CO IN BLOOD AND PULMONARY AND PLACENTAL TISSUE.
  APTIC-24892 07

BLOOD PRESSURE
  EXPERIMENTAL STUDY ON BLOOD PRESSURE IN CARBON MONOXIDE POISONING. (CHRONIC CARBON MONOXIDE POISONING SERIES XI).
  APTIC-25802 07

BLOWBY
  CONTROL DEVICES.
  APTIC-25632 02

BODY FLUIDS
  EFFECT OF IN VITRO EXPOSURE TO O3 ON SURFACE TENSION OF LUNG EXTRACT.
  APTIC-26115 07

BOILERS
  BOILERS AND THE CLEAN AIR ACTS.
  APTIC-24828 12

  REBIRTH OF A BOILERHOUSE.
  APTIC-24854 02

  EXAMPLES OF CITY-GAS COMBUSTION IN BOILERS.
  APTIC-25868 02

BOLOGNA
LEADED PARTICLES IN URBAN AREAS.
APTIC-25635 04

BONES
THE CHEMISTRY, HISTOLOGY, AND ROENTGENOLOGY OF THE TEETH AND BONES OF LARGE ANIMALS.
APTIC-25945 08

BORDEAUX
AIR POLLUTION BY CARBON MONOXIDE AT BORDEAUX.
APTIC-26013 04

BREATHING
TOXICOLOGICAL STUDIES ON HYDROCARBONS. IX. THE ASPIRATION HAZARD AND TOXICITY OF HYDROCARBONS AND HYDROCARBON MIXTURES.
APTIC-25640 07

THE EFFECT OF O3, NO2, AND SO2 EXPOSURE ON THE EXPERIMENTAL ASTHMA IN GUINEAPIGS.
APTIC-26117 07

THE TOXICOLOGICAL BASIS OF THRESHOLD LIMIT VALUES 5. THE EXPERIMENTAL INHALATION OF VAPOR MIXTURES BY RATS, WITH NOTES UPON THE RELATIONSHIP BETWEEN SINGLE DOSE INHALATION AND SINGLE DOSE ORAL DATA.
APTIC-26270 07

BRICKS
ACTIVITIES RELATED TO THE NON-MINING INDUSTRIES.
APTIC-25794 02

BRONCHIAL CANCER
BRONCHIAL CANCER IN THE IRON MINER OF THE LORRAINE BASIN. (BASED ON 225 OBSERVATIONS).
APTIC-26001 07

BRONCHITIS
INVESTIGATION OF THE RELATION BETWEEN THE HUMIDITY OF RESIDENCES AND CHRONIC ATTACKS OF THE BRONCHI OF MINORS.
APTIC-24772 07

HUMAN COSTS OF POLLUTED AIR.
APTIC-25561 07

INCIDENCE OF CHRONIC BRONCHITIS AND OF RESPIRATORY INSUFFICIENCY IN AN INDUSTRIAL RURAL POPULATION.
APTIC-25875 07

BROWNIAN MOVEMENT
ON THE ROLE OF BROWNIAN VIBRATIONS OF ULTRATHIN FIBERS IN AEROSOL FILTRATION.
APTIC-24840 02

THE ROLE OF DIFFUSIVITY IN TURBULENT DISPERSION.
APTIC-24909 06

AN ASYMPTOTIC METHOD FOR SOLVING EQUATIONS OF BROWNIAN MOTION OF AEROSOL PARTICLES.
APTIC-25807 06

BUBBLE TOWERS
A NOVEL PROCESS FOR NEUTRALIZING AN ALKALINE WASTE WATER AND FOR DESULFURIZING SMOKE.
APTIC-24645 02

DYNAMICS OF A GAS ABSORPTION COLUMN.
APTIC-24798 02

BUENOS AIRES
ATMOSPHERIC POLLUTANTS RESULTS TO DATE OF STUDIES CONDUCTED IN THE CITY OF BUENOS AIRES.
APTIC-26311 04

BUILDINGS
ABSTRACTS OF PAPERS ON INDOOR AIR POLLUTION (SUSPENDED PARTICULATES) CONTROL IN ARCHITECTURE. PART I.
APTIC-24684 03

THE APPLICATION OF AIR SAMPLING IN THE EVALUATION AND CONTROL OF THE OCCUPATIONAL ENVIRONMENT.
APTIC-25608 03

BURNERS
FLAME GRID AND COMPONENT PARTS THEREOF.
APTIC-23819 02

BUSES
TURBINE-POWERED BUSES. HOW GAS TURBINES WORK.
APTIC-24811 02

GASSING....THE BUG-A-BOO OF THE BUS BUSINESS.
APTIC-25594 03

BY-PRODUCT RECOVERY
PROCESS FOR OBTAINING ELEMENTAL SULFUR FROM SULFUR DIOXIDE OR GASES CONTAINING IT.
APTIC-23385 02

RECOVERY OF SULPHUR.
APTIC-24576 02

A NEW DRY PROCESS OF SO2 REMOVAL FROM FLUE GAS.
APTIC-24589 02

PROCESS FOR RECOVERING ELEMENTAL SULFUR FROM GASES CONTAINING SULFUR DIOXIDE.
APTIC-24599 02

PRODUCTION OF SULFUR TRIOXIDE AND SULFURIC ACID.
APTIC-24628 02

WASTE GYPSUM INTO USEFUL PRODUCTS.
APTIC-24646 02

DISPOSAL OF WASTE GAS CONTAINING DELUTE SULFUR OXIDE.
APTIC-24673 02

THERMODYNAMIC ANALYSIS OF THE REDUCTION OF SULFUR DIOXIDE BY METAL SULFIDES WITH THE FORMATION OF ELEMENTAL SULFUR.
APTIC-24703 06

THE FELD SCRUBBER FOR CLEANING METALLURGICAL SMOKE.
APTIC-24724 02

FLUE-GAS WASHING PROCESSES. PART THREE.
APTIC-24737 02

PROCEDURE FOR RECOVERING ELEMENTAL SULFUR FROM SULFUROUS GASES.
APTIC-24777 02

SMOG CONTROL HELPS BAG MORE PROFITS.
APTIC-24782 02

APTIC-24782 02

IMPROVED PROCEDURE FOR MANUFACTURING SULFUR.
APTIC-24786 02

RECOVERY OF REFINERY SULFUR IN AIR-POLLUTION CONTROL.
APTIC-24792 02

FLUORIDE RECOVERY FROM PHOSPHORUS PRODUCTION.
APTIC-24834 02

STUDIES ON THE REMOVAL OF SULFUR DIOXIDE FROM HOT FLUE GASES AS A MEASURE TO PREVENT AIR POLLUTION IV. RECOVERY OF FLUE GAS SULFUR AS AMMONIUM PHOSPHATE.
APTIC-24844 02

METHOD OF ELIMINATING SULFUR DIOXIDE AND HYDROGEN SULFIDE FROM EXHAUST GAS.
APTIC-24846 02

SULFUR EXTRACTION USING TRICHLOROETHYLENE IN PRESENCE OF LIMESTONE, TRONA, AND SODA ASH.
APTIC-25552 02

TRAIL SOLVES ITS SULPHUR PROBLEM.
APTIC-25589 02

PRELIMINARY EVALUATION OF CEMENT DUST FROM ELECTROFILTERS AS A POTASSIUM FERTILIZER.
APTIC-25609 02

PROCESS FOR OBTAINING ELEMENTAL SULFUR FROM THE WASTE GASES OF CARBON DISULFIDE MANUFACTURING.
APTIC-25650 02

THE MANUFACTURE OF PURE SULFUR DIOXIDE AND SULFUR FROM GASES CONTAINING SMALL AMOUNTS OF SULFUR.
APTIC-25670 02

POWER PLANT ASH--A NEGLECTED ASSET.
APTIC-25689 01

RESEARCH AND DEVELOPMENT OF STACK GAS DESULFURIZATION PROCESS.
APTIC-25702 02

PRODUCTION OF SOUR GAS-SULFUR WELLS EMPLOYING A SULFUR SOLVENT.
APTIC-25708 02

PURIFICATION OF INDUSTRIAL EXHAUST GASES.
APTIC-25743 02

THE DERIVATION OF GALLIUM AND ALUMINUM FROM COAL AND GAS DUSTS AND ASHES.
APTIC-25744 02

CONVERSION OF URBAN REFUSE TO OIL.
APTIC-25753 02

METHOD FOR MANUFACTURING SULFUR.
APTIC-25787 02

CARBON DISULFIDE--HYDROGEN SULFIDE BALANCE IN THE PRODUCTION OF VISCOSE TEXTILE FIBERS.
APTIC-25791 02

METHOD FOR MANUFACTURING SULFUR BY THE REDUCTION OF SULFUR DIOXIDE.
APTIC-25795 02

SULFUR DIOXIDE.
APTIC-25808 02

TRENDS IN THE UTILIZATION OF THE MOST IMPORTANT FORMS OF SULFUR-CONTAINING RAW MATERIAL.
APTIC-25938 02

SMELTERY FUMES--THEIR CONDENSATION AND UTILIZATION.
APTIC-25969 02

DISPOSAL METHOD OF SULFUR OXIDE (SO2, SO3)-CONTAINING GAS.
APTIC-26105 02

METHOD FOR THE DESULFURIZATION OF GASES CONTAINING HYDROGEN

SULFIDE OR SULFUR DIOXIDE AND FOR THE PREPARATION OF CRYSTALLINE SULFUR.
APTIC-26163 02

PROCESS FOR THE REMOVAL AND RECLAMATION OF SULFUR DIOXIDE FROM FLUE GASES.
APTIC-26164 02

PREPARATION OF SULFUR BY THE INTERACTION OF SULFUR DIOXIDE CONTAINING GASES WITH HEATED CARBON IN THE PRESENCE OF METAL COMPOUNDS.
APTIC-26165 02

THE SCA-BILLERUD RECOVERY PROCESS.
APTIC-26171 02

OXIDATION OF KRAFT BLACK LIQUOR -- WHERE DOES IT STAND
APTIC-26172 02

REMOVAL OF SULFUR COMPOUNDS FROM COAL GAS.
APTIC-26211 02

METHOD FOR THE PRODUCTION OF ELEMENTARY SULFUR FROM GASES CONTAINING HYDROGEN SULFIDE.
APTIC-26238 02

METHOD FOR PROCESSING LYE OBTAINED FROM THE SCRUBBING WITH AMMONIA OF GASES CONTAINING SULFUR DIOXIDE AND POSSIBLY SULFUR TRIOXIDE.
APTIC-26240 02

PROCESS FOR REMOVING SULPHUR DIOXIDE FROM A GAS.
APTIC-26272 02

CADMIUM
ATMOSPHERIC CORROSION OF ZINC- AND CADMIUM-COATED STEEL AND THE COEFFICIENTS FOR RECALCULATING THE RESULTS OF ACCELERATED CORROSION TESTS INTO DATA FOR SERVICE CONDITIONS.
APTIC-24972 09

CADMIUM COMPOUNDS
TECHNOLOGY OF POLLUTION-CONTROL IN ZINC AND LEAD SMELTING.
APTIC-26107 01

CALCIFICATION
PLEURAL CALCIFICATION AS A ROENTGENOLOGIC SIGN OF NON-OCCUPATIONAL ENDEMIC ANTHOPHYLLITE-ASBESTOSIS.
APTIC-22195 07

CALCIUM COMPOUNDS
A PROCESS FOR THE REMOVAL OF SULFUR COMPOUNDS FROM HOT CRACKING GAS.
APTIC-24749 02

CALIBRATION METHODS
CALIBRATION OF A TWO-STAGE AIR SAMPLER.
APTIC-22722 03

CALIFORNIA
A SUMMARY OF FEDERAL, STATE AND LOCAL AIR POLLUTION LAWS.
APTIC-24855 12

CONTROL OF AUTOMOBILE EMISSIONS- CALIFORNIA EXPERIENCE AND THE FEDERAL LEGISLATION.
APTIC-25591 12

CALVERT COUNTY
AIR POLLUTION IN CALVERT COUNTY, MARYLAND.
APTIC-12832 01

CANCER
WIDENING SPECTRUM OF ASBESTOS DISEASE.
APTIC-24934 07

THE CURRENT STATUS OF CANCER RESEARCH.
APTIC-24971 07

CARCINOGENS IN THE HUMAN ENVIRONMENT. (PART I).
APTIC-25681 07

RECENT DEVELOPMENTS IN ENVIRONMENTAL CANCER.
APTIC-26144 07

A FOLLOW-UP STUDY OF LEAD WORKERS.
APTIC-26177 07

CARBON BLACK
THE CONDITIONAL BIOLOGICAL ACTIVITY OF THE CARCINOGENS IN CARBON BLACKS, AND ITS ELIMINATION.
APTIC-24640 07

CARBON DIOXIDE
VENTILATION OF POLLUTED AIR IN ROOMS. VIII. STUDIES ON THEORETICAL EQUATIONS FOR VENTILATION OF POLLUTED AIR DIFFUSED HETEROGENEOUSLY IN ROOM.
APTIC-24647 06

HIGH ALTITUDE RADIATION MEASUREMENTS. (QUARTERLY REPORT).
APTIC-24753 03

SIMULTANEOUS DETERMINATION OF CARBON AND SULFUR IN ORGANIC COMPOUNDS BY GAS CHROMATOGRAPHY.
APTIC-24901 03

CAN STOMATA PLAY A PART IN PROTECTING PLANTS AGAINST AIR POLLUTANTS
APTIC-25536 08

INVESTIGATION OF THE ABSORPTION OF INFRARED RADIATION BY ATMOSPHERIC GASES.
APTIC-25853 06

OXYGEN-18 VARIATIONS IN ATMOSPHERIC CARBON DIOXIDE THE NASL DATA.
APTIC-26077 05

CARBON DISULFIDE
PRODUCTION OF CARBON DISULFIDE FROM METHANE AND SULFUR DIOXIDE.
APTIC-24596 06

ANIMAL EXPERIMENT INVESTIGATIONS OF CHRONIC CARBON DISULFIDE POISONING.
APTIC-25567 07

PROCESS FOR OBTAINING ELEMENTAL SULFUR FROM THE WASTE GASES OF CARBON DISULFIDE MANUFACTURING.
APTIC-25650 02

CARBON DISULFIDE--HYDROGEN SULFIDE BALANCE IN THE PRODUCTION OF VISCOSE TEXTILE FIBERS.
APTIC-25791 02

THE FORMATION OF CARBON DISULFIDE RESULTING FROM THE REACTION BETWEEN SULFUR DIOXIDE AND COAL.
APTIC-26155 02

PROCEDURE FOR THE MANUFACTURE OF SULFUR FROM SULFUR DIOXIDE OR FROM GAS MIXTURES CONTAINING SULFUR DIOXIDE.
APTIC-26178 02

CARBON MONOXIDE
THE ROLE OF THE SAMPLE HOLDER IN THE THERMAL INVESTIGATION OF PROCESSES ACCOMPANIED BY THE SPLITTING OFF OF CO.
APTIC-24653 06

THE POSSIBILITY OF DECREASING THE CARBON MONOXIDE CONTENT OF EXHAUST GASES FROM BENZENE ENGINES.
APTIC-24689 02

PRINCIPAL AGENTS OF POLLUTION AND THEIR RATE OF DISPERSAL.
APTIC-24776 04

THE CALIFORNIA TEST. FIGHT AGAINST AIR POLLUTION BY MEANS OF CONTROL MEASURES APPLICABLE TO NEW AUTOMOBILES IN THE U.S.A.
APTIC-24859 12

MEASUREMENT OF THE LIFETIME OF THE A 1 PI STATE OF CO BY LEVEL-CROSSING SPECTROSCOPY.
APTIC-24888 06

THE PHOTOELECTRON SPECTRA OF O2, N2 AND CO.
APTIC-24889 06

SOLUBILITY OF O2 AND CO IN BLOOD AND PULMONARY AND PLACENTAL TISSUE.
APTIC-24892 07

TRANSFER VALUES OF CARBON MONOXIDE IN NORMAL HUMANS IN A STABLE VENTILATION STATE AT REST.
APTIC-24931 06

MOTOR FUMES AND ATMOSPHERIC POLLUTION.
APTIC-24961 07

CARBON MONOXIDE PARTIAL PRESSURE IN TISSUE OF DIFFERENT ANIMALS.
APTIC-25562 07

CARBON MONOXIDE LEVELS IN ACUTE MYOCARDIAL INFARCTION.
APTIC-25578 07

PROCESS FOR MANUFACTURING SULFUR FROM SULFUR OXIDES, USING CARBON MONOXIDE.
APTIC-25649 02

NEUROLOGIC MANIFESTATIONS OF CHRONIC CARBON MONOXIDE POISONING.
APTIC-25695 07

CATALYTIC REACTION OF CARBON MONOXIDE WITH STEAM.
APTIC-25700 02

SELECTIVE METHANATION OF CARBON MONOXIDE.
APTIC-25736 02

DEVICE FOR REDUCING THE CONTENT OF CARBON MONOXIDE IN THE EXHAUST GASES FROM AN INTERNAL COMBUSTION ENGINE.
APTIC-25737 02

FEATURES OF A COMBINED ACTION OF SULFUROUS GAS AND CARBON MONOXIDE IN THEIR JOINT PRESENCE IN THE ATMOSPHERE.
APTIC-25790 07

CARBON MONOXIDE IN TOWN AIR AN INTERIM REPORT.
APTIC-25799 04

THE EFFECT OF CARBON MONOXIDE ON TISSUE RESPIRATION. CHRONIC CARBON MONOXIDE POISONING SERIES VI.
APTIC-25800 07

EXPERIMENTAL STUDY ON BLOOD PRESSURE IN CARBON MONOXIDE POISONING. (CHRONIC CARBON MONOXIDE POISONING SERIES XI).
APTIC-25802 07

THE EFFECT OF PROLONGED EXPOSURE TO CARBON MONOXIDE ON HUMAN HEALTH.
APTIC-25810 07

EXPERIMENTAL CARBON MONOXIDE POISONING ITS

ELECTROPHYSIOLOGICAL EFFECTS ON THE VISUAL PATHWAY IN CATS.
APTIC-25836 07

THE REACTION OF ORGANIC ANIONS WITH CARBON MONOXIDE. (FINAL REPORT).
APTIC-25852 06

USE OF THERMODESORPTION TECHNIQUE FOR STUDYING GAS ADSORPTION CARBON MONOXIDE ON NICKEL.
APTIC-25866 06

A PRACTICAL, MULTIPURPOSE URBAN DIFFUSION MODEL FOR CARBON MONOXIDE. (FINAL REPORT).
APTIC-25995 05

AIR POLLUTION BY CARBON MONOXIDE AT BORDEAUX.
APTIC-26013 04

THRESHOLD LIMIT VALUES FOR CARBON MONOXIDE.
APTIC-26103 11

EFFECTS ON RAT OF CHRONC EXPOSURE OF LOW CONCENTRATION OF CO. PART I.
APTIC-26113 07

PERMANENT DAMAGE TO THE NERVOUS SYSTEM CAUSED BY CARBON MONOXIDE POISONING OF A FETUS.
APTIC-26160 07

EXPERT COMMITTEE REPORT ON THE STANDARDS FOR ENVIRONMENTAL POLLUTION DUE TO CARBON MONOXIDE.
APTIC-26170 07

POWER AND INDUSTRY CONTROL OF CARBON MONOXIDE EMISSIONS.
APTIC-26232 02

A DEVICE FOR THE PROLONGED AND REPEATED EXPOSURE OF ANIMALS TO CARBON MONOXIDE. (CHRONIC CARBON MONOXIDE POISONING SERIES II).
APTIC-26236 07

POSSIBLE ASSOCIATION OF MOTOR VEHICLE ACCIDENTS WITH POLLUTANT LEVELS IN LOS ANGELES.
APTIC-26247 07

A SENSITIVE PROCEDURE FOR DETERMINING CARBON MONOXIDE IN BLOOD OR TISSUE UTILIZING GAS-SOLID CHROMATOGRAPHY.
APTIC-26252 07

'THE WEEK OF DRUG AND HEALTH' IN 1969. REPORT OF THE INVESTIGATION OF PUBLIC NUISANCE BY TRAFFIC IN BIG CITIES IN JAPAN.
APTIC-26286 04

CARBONATES
LEASE-GAS SWEETENING. PART 6. HOT CARBONATE--ANOTHER POSSIBILITY.
APTIC-24871 02

CARBONYLS
DEVELOPMENT OF MOLECULAR CONDENSATION NUCLEI AND CONDITIONS FOR ITS OBSERVATION.
APTIC-24764 06

CARBOXYHEMOGLCBIN
PSYCHOPHARMACOLOGY OF CARBON MONOXIDE UNDER AMBIENT AND ALTITUDE CONDITIONS.
APTIC-24958 07

CELL AND SOLUTION VELOCITY CONSTANTS FOR THE REACTION CO & HB YIELDS COHB AT DIFFERENT TEMPERATURES IN MAMMALS WITH DIFFERENT RED CELL SIZES.
APTIC-25035 07

A SENSITIVE PROCEDURE FOR DETERMINING CARBON MONOXIDE IN BLOOD OR TISSUE UTILIZING GAS-SOLID CHROMATOGRAPHY.
APTIC-26252 07

CARBURETION
THE POSSIBILITY OF DECREASING THE CARBON MONOXIDE CONTENT OF EXHAUST GASES FROM BENZENE ENGINES.
APTIC-24689 02

CARCINOGENS
CARCINOGENIC HYDROCARBONS AND RELATED COMPOUNDS IN PROCESSED RUBBER.
APTIC-24629 01

APTIC-24629 01

THE CONDITIONAL BIOLOGICAL ACTIVITY OF THE CARCINOGENS IN CARBON BLACKS, AND ITS ELIMINATION.
APTIC-24640 07

STUDIES OF THE MODE OF ACTION OF ASBESTOS AS A CARCINOGEN.
APTIC-24925 07

CARCINOGENS IN THE HUMAN ENVIRONMENT. (PART I).
APTIC-25681 07

FOOD IN A CARCINOGENIC ENVIRONMENT.
APTIC-25704 07

AIR POLLUTANT EXPOSURE AND RESPIRATORY CANCER.
APTIC-25765 07

INHIBITION OF CARCINOGENESIS.
APTIC-25865 07

INTRATRACHEAL ADMINISTRATION OF DUST PARTICLES AND CARCINOGENS IN RATS.
APTIC-36099 07

RECENT DEVELOPMENTS IN ENVIRONMENTAL CANCER.
APTIC-26144 07

CARCINOGENIC HAZARDS OF AROMATIC POLYCYCLIC HYDROCARBONS IN THE POLLUTED ATMOSPHERE.
APTIC-26206 07

CARIBBEAN SEA
PRECIPITATION CHARACTERISTICS SHIPBOARD MEASUREMENTS IN THE CARIBBEAN SEA.
APTIC-26162 05

CASCADE SAMPLERS
SEPARATION MECHANISM OF ROUND NOZZLE CASCADE IMPACTOR EFFECT OF CLEARANCE RATIO.
APTIC-25719 03

ON THE SEPARATION OF AIRBORNE MATTER BY INERTIA EFFECT IN THE SUBMICRONIC RANGE.
APTIC-25771 03

THE CASCADE CENTRIPETER FOR THE PARTICLE SIZE DETERMINATION AND ITS APPLICATION TO THE CHEMICAL ANALYSIS BY THE RING OVEN.
APTIC-26292 03

CATALYSIS
CATALYTIC REACTION OF CARBON MONOXIDE WITH STEAM.
APTIC-25700 02

CATALYSTS
METHOD FOR CONVERTING HYDROGEN SULFIDE TO OBTAIN SULFUR.
APTIC-24908 02

METHOD FOR THE PREPARATION OF A CATALIST FOR THE CONVERSION OF H2S AND/OR SO2 TO ELEMENTARY SULFUR.
APTIC-24936 02

CATALYST FOR ENGINE EXHAUST-GAS REFORMATION.
APTIC-25553 02

EQUILIBRATION AND STEAM-REFORMING CATALYSTS.
APTIC-25601 02

HYDRODESULFURIZATION OF HEAVY PETROLEUM DISTILLATES.
APTIC-25713 02

SELECTIVE METHANATION OF CARBON MONOXIDE.
APTIC-25736 02

METHOD FOR MANUFACTURING SULFUR.
APTIC-25787 02

CATALYTIC HYDROGENATION OF SULFUR DIOXIDE.
APTIC-25789 02

SULPHUR REMOVAL FROM GASES.
APTIC-25814 02

PROCEDURE FOR MANUFACTURING SULFUR BY THE REDUCTION OF SULFUROUS ACID.
APTIC-25972 02

METHOD OF MANUFACTURING SULFUR FROM GASES CONTAINING SULFUR DIOXIDE.
APTIC-25973 02

METHOD OF MANUFACTURING SULFUR BY THE REDUCTION OF SULFUR DIOXIDE.
APTIC-25974 02

CHEMICAL STRUCTURES AND ACTIVITIES OF THE HYDRODESULFURIZATION CATALYSTS.
APTIC-26010 02

THE DISTRIBUTION OF CARBON, VANADIUM AND NICKEL DEPOSITS ON CATALYST LAYER DURING HYDRODESULFURIZATION PROCESSES OF PETROLEUM RESIDUUM.
APTIC-26129 02

ON HYDROCRACKING DESULFURIZATION CATALYST FOR RESIDUAL OIL.
APTIC-26132 02

ON UOP RCD ISOMAX METHOD.
APTIC-26133 02

PREPARATION OF SULFUR BY THE INTERACTION OF SULFUR DIOXIDE CONTAINING GASES WITH HEATED CARBON IN THE PRESENCE OF METAL COMPOUNDS.
APTIC-26165 02

METHOD FOR OBTAINING SULFUR FROM THE GASEOUS PRODUCTS GIVEN OFF BY THE ROASTING AND SMELTING OF SULFIDE ORES.
APTIC-26179 02

IMPROVED METHOD OF MAKING SULPHUR FROM SULPHUR DIOXIDE.
APTIC-26197 02

CATALYTIC ACTIVITY
EBULLATED (SIC) BED H-OIL METHOD.
APTIC-26006 02

CATALYTIC AFTERBURNERS
ENGINE EXHAUST GAS PURIFICATION DEVICE.
APTIC-24822 02

EXHAUST GAS PURIFICATION DEVICE FOR AUTOMOTIVE INTERNAL COMBUSTION ENGINE.
APTIC-24823 02

CATALYST FOR ENGINE EXHAUST-GAS REFORMATION.
APTIC-25553 02

CATALYTIC OXIDATION UNIT FOR DOMESTIC OVEN EXHAUST.
APTIC-25554 02

IMPROVED PROCEDURE FOR PURIFYING THE EXHAUST OF INTERNAL COMBUSTION MOTORS.
APTIC-26243 02

REMOVAL OF ODOR OF ORGANIC SOLVENT AND UTILIZATION OF RECOVERED HEAT BY U.O.P. CATALYTIC COMBUSTION SYSTEM.
APTIC-26308 02

CATALYTIC OXIDATION
OXIDATION OF SULFUR DIOXIDE ON A VANADIUM CATALYST.
APTIC-24623 06

PRODUCTION OF SULFUR TRIOXIDE AND SULFURIC ACID.
APTIC-24628 02

THE ROLE OF THE SAMPLE HOLDER IN THE THERMAL INVESTIGATION OF PROCESSES ACCOMPANIED BY THE SPLITTING OFF OF CO.
APTIC-24653 06

PURIFICATION OF FUMES IN THE LACQ COMPLEX.
APTIC-24706 02

PROCESS FOR THE CONVERSION OF HYDROGEN SULFIDE WITH SULFUR DIOXIDE TO ELEMENTARY SULFUR.
APTIC-24751 02

A METHOD OF OXIDIZING HYDROGEN SULFIDE TO ELEMENTARY SULFUR.
APTIC-24752 02

RESULTS OF THERMAL AND OF CATALYTIC PROCESSES TO LIMIT OLFACTORY EMISSIONS OF ORGANIC CHEMICAL COMPOUNDS.
APTIC-24754 02

EQUILIBRATION AND STEAM-REFORMING CATALYSTS.
APTIC-25601 02

PROCESS FOR OBTAINING ELEMENTAL SULFUR FROM THE WASTE GASES OF CARBON DISULFIDE MANUFACTURING.
APTIC-25650 02

CONVERSION OF SULFUR DIOXIDE TO SULFUR TRIOXIDE.
APTIC-25651 02

GAS TESTING PROCESS FOR SMOG FORMING CONSTITUTENTS.
APTIC-25734 03

RECOVERING ELEMENTAL SULFUR FROM WATERS CONTAINING HYDROGEN SULFIDE.
APTIC-25984 02

REGENERATION METHOD OF GAS DESULFURIZATION LIQUOR.
APTIC-26046 02

FERRIC SULPHATE AND SULPHURIC ACID FROM SULPHUR DIOXIDE AND AIR.
APTIC-26142 02

STUDY OF THE SO2 OXIDATION IN SOLUTION AND ITS ROLE IN ATMOSPHERIC CHEMISTRY.
APTIC-26185 02

THE TECHNICAL PROCESSES FOR THE DESULFURIZATION OF GASES.
APTIC-26202 02

CATTLE
CONTAMINATION OF DAIRY FEEDS BY AIR POLLUTION.
APTIC-26276 08

CELL GROWTH
ENVIRONMENTAL INFLUENCE ON INTRAUTERINE LUNG DEVELOPMENT.
APTIC-26207 07

CELL METABOLISM
IDENTIFICATION OF METABOLITES OF BENZO(A)PYRENE PRODUCED BY CELLS FROM HAMSTERS SUSCEPTIBLE TO CHEMICAL CARCINOGENESIS.
APTIC-25968 07

CELLS
PRELIMINARY INVESTIGATIONS ON THE BIOSYNTHESIS OF METHYL ESTERS OF FATTY ACIDS IN RHIZOPUS ARRHIZUS FISCHER.
APTIC-12755 06

EFFECT OF AUTOMOBILE EXHAUST ON CELL GROWTH IN VITRO.
APTIC-25604 03

THE EFFECT OF AIR POLLUTANTS ON THE EYE. I. THE EFFECT OF AN ORGANIC EXTRACT ON THE CONJUNCTIVAL GOBLET CELLS.
APTIC-25703 07

CEMENTS
DUST FALL IN THE VICINITY OF CEMENT FACTORIES AS IT RELATES TO POSSIBLE HEALTH HAZARDS PART 2.
APTIC-24708 07

PRELIMINARY EVALUATION OF CEMENT DUST FROM ELECTROFILTERS AS A POTASSIUM FERTILIZER.
APTIC-25609 02

THE CALAVERAS CEMENT CO. DUST SUIT.
APTIC-25682 12

THE PROBLEM OF CEMENT FACTORY DUST FROM THE AGRICULTURAL STANDPOINT.
APTIC-25964 08

CENTRIFUGAL SEPARATORS
DESIGN CHARACTERISTICS AND TEST RESULTS OF A NEW MULTICELL FILTER.
APTIC-24642 02

ROTATING CENTRIFUGAL SEPARATOR WITH CONTINUOUS DUST DISCHARGE.
APTIC-24831 02

DE-DUSTING DEVICE FOR SMOKE AND OTHER GASEOUS FLUIDS.
APTIC-25550 02

NEW DUST REMOVAL METHODS IN THE TOBACCO INDUSTRY.
APTIC-25588 02

DEVICE FOR REDUCING THE CONTENT OF CARBON MONOXIDE IN THE EXHAUST GASES FROM AN INTERNAL COMBUSTION ENGINE.
APTIC-25737 02

CENTRIFUGE SEDIMENTATION SIZE ANALYSIS OF SAMPLES OF AIRBORNE DUSTS COLLECTED IN MEMBRANE FILTERS.
APTIC-25843 03

A NEW ROAD TO ACCELERATED GRAIN-SIZE ANALYSIS IN THE RANGE FROM 10 MICRON TO 0.1 MICRON IN DIAMETER.
APTIC-26060 03

CHAIN SCISSION
THE EFFECT OF AIR POLLUTANTS ON POLYMERS.
APTIC-25680 09

CHARCOAL
MANUFACTURING METHOD OF ACTIVATED CHARCOAL.
APTIC-24672 02

THE EVALUATION OF THE IGNITION TEMPERATURE OF ACTIVATED CHARCOALS IN AIR, STEAM, OXYGEN AND OXIDES OF NITROGEN.
APTIC-26220 02

CHATTANOOGA
CHATTANOOGA, TENNESSEE -- ROSSVILLE, GEORGIA INTERSTATE AIR QUALITY STUDY 1967-1968.
APTIC-26086 04

CHEMICAL BONDS
KINETIC EVIDENCE CONCERNING THE GEOMETRY OF SUBSTITUTED METHYL RADICALS.
APTIC-25985 06

CHEMICAL COMPOSITION
MOTOR EXHAUST COMPOSITION IN RELATION TO SELECTED FUELS.
APTIC-24729 01

EFFECT OF COLD STORAGE ON THE FLUORIDE CONTENT OF ALFALFA.
APTIC-24886 03

HYDROCHEMICAL STUDY OF ATMOSPHERIC PRECIPITATION.
APTIC-25812 05

CHEMICAL COMPOSITION OF FINELY-DISPERSED DUST FORMED DURING BLOWING OXYGEN THROUGH THE MELT IN THE HEARTH OF A STEEL FURNACE. 1ST COMMUNICATION.
APTIC-26018 02

CHEMICAL METHODS
A COMPARATIVE STUDY OF OXIDANTS AND OZONE IN LOS ANGELES ATMOSPHERE.
APTIC-24597 03

AN ABSORPTION APPARATUS FOR GAS ANALYSIS.
APTIC-24651 03

EFFECT OF PARTICLE SIZE ON THE DETERMINATION OF INORGANIC SULFUR IN COAL.
APTIC-24725 03

ANALYTICAL METHODS USED TO DETERMINE DAMAGE BY ACIDS IN THE ATMOSPHERE.
APTIC-24970 03

CURRENT INFORMATION ON THE QUANTITIES OF FLUORIDE FOUND IN AIR, FOOD, AND WATER.
APTIC-25806 03

SOME PROBLEMS OF ATMOSPHERIC CHEMISTRY.
APTIC-25925 03

CHEMICAL PROCESSING
MANUFACTURING METHOD OF ACTIVATED CHARCOAL.
APTIC-24672 02

ABATEMENT OF AIR POLLUTION IN THE CHEMICAL INDUSTRY.
APTIC-24783 01

TREATMENT OF WASTE AIR AND GASES IN THE PROCESS INDUSTRIES.
APTIC-24755 02

SEPARATION OF PLASTICIZER MISTS IN THE PROCESSING OF PVC MIXTURES.
APTIC-24937 02

CHEMICAL REACTIONS
ADDITION OF DINITROGEN TRIOXIDE TO NONCONJUGATED DIENES.
APTIC-26165 06

PRODUCTION OF CARBON DISULFIDE FROM METHANE AND SULFUR DIOXIDE.
APTIC-24596 06

HYDROGEN SULFIDE FROM SULFUR DIOXIDE AND METHANE.

APTIC-24739 06

THE REACTION OF ETHANE IN SPARK IGNITION ENGINE EXHAUST GAS.
APTIC-24747 01

THE DISAPPEARANCE OF ETHYLENE, PROPYLENE, N-BUTANE, AND 1-BUTANE IN SPARK-IGNITION ENGINE EXHAUST.
APTIC-24748 01

BENZO(A)PYRENE AND BENZ(A)ANTHRACENE.
APTIC-24905 06

A DOUBLE BRADSHER REACTION.
APTIC-25659 06

CHEMILUMINESCENT METHOD
CHEMILUMINESCENT MEASUREMENT OF ATMOSPHERIC OZONE RESPONSE CHARACTERISTICS AND OPERATING VARIABLES.
APTIC-25653 03

CHICAGO
CONTINUOUS AIR MONITORING PROJECTS 1968 DATA TABULATIONS AND SUMMARIES, CHICAGO.
APTIC-25803 04

CHILDREN
DETERMINATION OF THE COEFFICIENT OF THE VITALLY NECESSARY VOLUME OF THE LUNGS OF CHILDREN.
APTIC-24690 07

INVESTIGATION OF THE RELATION BETWEEN THE HUMIDITY OF RESIDENCES AND CHRONIC ATTACKS OF THE BRONCHI OF MINORS.
APTIC-24772 07

EFFECTS OF AIR POLLUTION ON SCHOOL ABSENCES AND DIFFERENCES IN LUNG FUNCTION IN FIRST AND SECOND GRADERS IN BERLIN, NEW HAMPSHIRE, JANUARY 1966 TO JUNE 1967.
APTIC-25563 07

PREVALENCE OF RESPIRATORY SYMPTOMS AND PEAK FLOW RATE OF THREE YEAR OLD CHILDREN.
APTIC-26089 07

THE STATISTICAL SURVEY ON UPPER RESPIRATORY REGION OF SCHOOLCHILDREN IN THE AIR POLLUTION AREA IN WAKAYAMA.
APTIC-26114 07

CHLORINATED HYDROCARBONS
SEVERAL TYPES OF SIDE-EFFECTS.
APTIC-24667 08

SEPARATION OF PLASTICIZER MISTS IN THE PROCESSING OF PVC MIXTURES.
APTIC-24937 02

EVALUATION OF METHODS FOR THE DETERMINATION OF HALOGENATED HYDROCARBONS IN AIR.
APTIC-25692 03

CHLORINE
GALVANIC APPARATUS FOR THE STUDY OF GASES. II. CONTINUOUS DETERMINATION OF SMALL AMOUNTS OF CHLORINE IN GASES.
APTIC-24863 03

ODOR CONTROL WITH CHLORINE CUTS COST.
APTIC-25623 02

CHROMATOGRAPHY
CONTINUOUS MEASUREMENT OF LOW GRADE HYDROCARBONS IN URBAN ATMOSPHERE.
APTIC-26109 03

CINCINNATI
CONTINUES AIR MONITORING PROJECTS 1968 DATA TABULATIONS AND SUMMARIES, CINCINNATI.
APTIC-25817 04

CITY GOVERNMENTS
A PRELIMINARY EXPLORATION OF THE RELATIONSHIP BETWEEN AIR POLLUTION AND CITY DATA.
APTIC-24611 12

APTIC-24611 12

CLAY
MANUFACTURING METHOD FOR SULFUR DIOXIDE ABSORBENT.
APTIC-24815 02

THE EFFECT OF HEAT TREATMENT ON THE STRUCTURE OF KAOLIN AND ITS IN VITRO HEMOLYTIC ACTIVITY.
APTIC-25891 07

CLEAN AIR ACT
PROGRESS IN STATE AND LOCAL AIR POLLUTION CONTROL UNDER THE CLEAN AIR ACT.
APTIC-12495 12

CONTROL OF AUTOMOBILE EMISSIONS- CALIFORNIA EXPERIENCE AND THE FEDERAL LEGISLATION.
APTIC-25591 12

ROLE OF THE FEDERAL GOVERNMENT IN AIR POLLUTION CONTROL.
APTIC-25595 12

CLOUDS
THEORETICAL COLLISION EFFICIENCIES OF CHARGED CLOUD DROPLETS.
APTIC-24662 05

EVAPORATION RATES AND LIFETIMES OF CLOUDS AND SPRAYS IN AIR. II. THE CONTINUUM MODEL.
APTIC-24890 05

COAL
COAL AND CLEAN AIR.
APTIC-23726 01

DISPOSAL METHOD FOR SULFUROUS ACID CONTAINED IN WASTE GAS.
APTIC-24683 02

PROBLEMS IN THE GRAVIMETRIC MEASUREMENT OF RESPIRABLE COAL MINE DUST.
APTIC-24656 03

DUST COLLECTION AT ITMANN PREPARATION PLANT.
APTIC-24679 02

EFFECT OF PARTICLE SIZE ON THE DETERMINATION OF INORGANIC SULFUR IN COAL.
APTIC-24725 03

COAL CHARACTERISTICS
EFFICIENCY OF ELECTROSTATIC PRECIPITATORS AS AFFECTED BY THE PROPERTIES AND COMBUSTION OF COAL.
APTIC-25786 02

COAL PREPARATION
METHOD FOR THE SEPARATION OF PYRITE FROM COAL.
APTIC-24609 02

INVESTIGATIONS ON THE REDUCTION OF THE SULFUR CONTENT OF COKE DURING CARBONIZATION.
APTIC-24610 02

REMOVAL OF SULFUR FROM FUELS AND PRODUCTS OF COMBUSTION.
APTIC-25961 02

COAL RESOURCES
THE WESTERN COAL DEPOSITS A NATIONAL SOURCE OF POWER.
APTIC-24955 01

CODES
RESEARCH ON ODOR CONTROL IN THE U.S.A. (A CHAPTER OF RENDERING PLANTS IN WEST COAST).
APTIC-26057 12

COGNITIVE DISSONANCE
DIFFERENTIAL RESPONSES TO AIR POLLUTION AS AN ENVIRONMENTAL HEALTH PROBLEM.
APTIC-26303 13

COKE
INVESTIGATIONS ON THE REDUCTION OF THE SULFUR CONTENT OF COKE DURING CARBONIZATION.
APTIC-24610 02

DESULFURIZATION OF FLUE GAS WITH ADSORPTION COKE OF VARIABLE PROPERTIES.
APTIC-24709 02

SOOT OBTAINED FROM SOLID FUELS.
APTIC-25545 01

DUST AND SOOT NUISANCES AT A METALLURGICAL COKING PLANT AND IN ITS ENVIRONMENT.
APTIC-26040 01

COKE OVEN GAS
EVALUATION OF THE PROCESS OF OBTAINING AROMATIC HYDROCARBONS FROM COKE-OVEN GAS.
APTIC-24620 02

DETERMINING THE COMPOSITION OF RAW BENZENE BY GAS-LIQUID CHROMATOGRAPHY.
APTIC-24621 03

COLLECTORS
DUST COLLECTION AT ITMANN PREPARATION PLANT.
APTIC-24679 02

AIR POLLUTION IN HOLLAND.
APTIC-24915 02

EFFECT OF FILTER MEDIA MICROSTRUCTURE ON DUST COLLECTION.
APTIC-25960 02

ELIMINATION OF POLLUTION CAUSED BY FOUNDRY WORKS.
APTIC-26058 02

COLLISION EFFICIENCIES
THEORETICAL COLLISION EFFICIENCIES OF CHARGED CLOUD DROPLETS.
APTIC-24662 05

COLLISION-RATE THEORY
COLLISION-RATE THEORY AND THE COAGULATION OF FREE-MOLECULE AEROSOLS.
APTIC-25984 05

COLORIMETRY
CONTINUOUS SAMPLING AND ULTRAMICRODETERMINATION OF NITROGEN DIOXIDE IN AIR.
APTIC-24900 03

THE MICRODETERMINATION OF FLUORIDE IN VEGETATION.
APTIC-24966 03

SPECTROCOLORIMETRIC DETERMINATION OF HEXACHLOROCYCLOHEXANE IN THE ATMOSPHERE.
APTIC-24975 03

ZINC ACETATE CYLINDER METHOD (INTEGRAL) FOR HYDROGEN SULFIDE

IN THE AIR AS AIR POLLUTANT.
APTIC-25572 03

AN AUTOMATIC HYDROGEN FLUORIDE RECORDER PROPOSED FOR INDUSTRIAL HYGIENE AND STACK MONITORING.
APTIC-25647 03

DETECTIONS OF ALCOHOLS IN GAS ATMOSPHERES.
APTIC-25666 03

EVALUATION OF METHODS FOR THE DETERMINATION OF HALOGENATED HYDROCARBONS IN AIR.
APTIC-25692 03

DETERMINATION OF 2-NITROPROPANE AND OF NITRITE IN MIXTURES.
APTIC-25824 03

MEASUREMENT OF THE SULFUR TRIOXIDE CONTENT OF THE AIR.
APTIC-25854 03

DETERMINATION OF ARSENIC IN THE ATMOSPHERE.
APTIC-25861 03

QUANTITATIVE ANALYZER OF SULFUR CONTENTS.
APTIC-25911 03

DETERMINATION OF NO2 AND NO IN AIR.
APTIC-25918 03

A PRACTICAL METHOD FOR THE RAPID DETERMINATION OF LEAD WHEN FOUND IN THE ATMOSPHERE.
APTIC-25932 03

COMPLEXOMETRIC DETERMINATION OF SULFUR TRIOXIDE AND SULFUR DIOXIDE IN WASTE PROCESS GASES.
APTIC-26067 03

ON HYDROGEN FLUORIDE AIR POLLUTION MONITORING DEVICE.
APTIC-26121 03

VOLUMETRIC DETERMINATION OF CONCENTRATIONS OF SULFURYL FLUORIDE IN AIR.
APTIC-26203 03

CELLULOSE SUPPORTED THORIUM-ALIZARIN RED S REAGENT FOR FLUORIDE ION DETERMINATION.
APTIC-26259 03

RESPECTIVE DETERMINATION OF NO AND NO2.
APTIC-26291 03

COLUMN CHROMATOGRAPHY
TEMPERATURE AS A FACTOR IN DETERMINING ORDER OF ELUTION IN GAS-LIQUID CHROMATOGRAPHY OF SOME C5-C8 HYDROCARBONS.
APTIC-24587 03

COMBUSTION
TOXICOLOGIC ASPECTS OF FLAMMABILITY AND COMBUSTION OF POLYMERIC MATERIALS.
APTIC-24153 07

AIR POLLUTION BY GAS TURBINES -- IS CONTROL POSSIBLE
APTIC-24631 02

STABILIZATION OF TURBULENT DIFFUSION FLAMES.
APTIC-24698 06

POLLUTION FROM COMBUSTION OF FOSSIL FUELS.
APTIC-24732 01

ABATEMENT OF AIR POLLUTION IN THE CHEMICAL INDUSTRY.
APTIC-24743 01

RESULTS OF THERMAL AND OF CATALYTIC PROCESSES TO LIMIT OLFACTORY EMISSIONS OF ORGANIC CHEMICAL COMPOUNDS.
APTIC-24754 02

TACKLING THE PROBLEM OF NITROGEN OXIDES.
APTIC-24922 02

CONTROL DEVICES.
APTIC-25632 02

CHEMICAL MODELS FOR COMBUSTION AND ATMOSPHERIC POLLUTION.
APTIC-25963 06

THE EVALUATION OF THE IGNITION TEMPERATURE OF ACTIVATED CHARCOALS IN AIR, STEAM, OXYGEN AND OXIDES OF NITROGEN.
APTIC-26220 02

POWER AND INDUSTRY CONTROL OF NITROGEN OXIDE EMISSIONS.
APTIC-26226 02

COMBUSTION CHAMBER INVESTIGATIONS BY MEANS OF MICROWAVE RESONANCES.
APTIC-26268 03

COMBUSTION AIR
REDUCING JET POLLUTION BEFORE IT BECOMES SERIOUS.
APTIC-26181 02

COMBUSTION GASES
CHARACTERISTICS OF PHOTOSYNTHESIS AND OF SOME OTHER PROCESSES IN CONNECTION WITH SMOKE AND GAS RESISTANCE OF TREES AND SHRUBS.
APTIC-24593 08

EQUILIBRATION AND STEAM-REFORMING CATALYSTS.
APTIC-25601 02

STUDIES ON THE ANALYSIS OF HYDROCARBONS FROM INCINERATOR EFFLUENTS WITH A COMBUSTIBLE GAS INDICATOR.
APTIC-25696 03

OXIDES OF NITROGEN IN THE COMBUSTION PRODUCTS OF AN AMMONIA FUELED RECIPROCATING ENGINE.
APTIC-25825 01

METHOD AND APPARATUS FOR RECYCLING DRYER STACK GASES.
APTIC-25863 02

COMBUSTION PRODUCTS
COAL AND CLEAN AIR.
APTIC-23726 01

SOOT OBTAINED FROM SOLID FUELS.
APTIC-25545 01

THE DERIVATION OF GALLIUM AND ALUMINUM FROM COAL AND GAS DUSTS AND ASHES.
APTIC-25744 02

CHEMICAL MODELS FOR COMBUSTION AND ATMOSPHERIC POLLUTION.
APTIC-25963 06

COMMERCIAL EQUIPMENT
DUST REMOVAL, KEEPING AIR CLEAN AND REFUSE DISPOSAL.
APTIC-25860 02

DEODORIZING EQUIPMENT AND DEODORANTS.
APTIC-26128 02

COMMERCIAL FIRMS
POLLUTION CONTROL A CORPORATE DILEMMA.
APTIC-23612 12

COMPLEX FORMATION
COMPLEXOMETRIC DETERMINATION OF SULFUR TRIOXIDE AND SULFUR DIOXIDE IN WASTE PROCESS GASES.
APTIC-26067 03

CELLULOSE SUPPORTED THORIUM-ALIZARIN RED S REAGENT FOR FLUORIDE ION DETERMINATION.
APTIC-26259 03

COMPLEXES
COMPLEX FORMATION OF IMIDAZOLE AND PYRROLE IN AQUEOUS PHASE AND PREFERENTIAL FIXATION OF 3,4-BENZOPYRENE BY THE MEDIUM.
APTIC-25746 06

COMPRESSED GASES
FLUE-GAS WASHING PROCESSES. PART THREE.
APTIC-24737 02

THE REVAPORIZATION OF LIQUEFIED NATURAL GAS.
APTIC-24919 02

EXHAUST EMISSIONS FROM SEVEN LP GAS POWERED VEHICLES.
APTIC-25678 02

THE LIQUEFIED NATURAL GAS PLANT OF THE 'WISCONSIN NATURAL' COMPANY AND ITS SPECIAL CHARACTERISTICS.
APTIC-25745 02

LIQUEFIED NATURAL GAS AS INDUSTRIAL FUEL.
APTIC-25893 02

COMPRESSION
FIRST NATURAL GAS LIQUEFACTION PLANT.
APTIC-25748 02

CONTINUOUSLY WORKING PLANT FOR THE SEPARATION OF NEON-HELIUM MIXTURES.
APTIC-25809 02

REFUSE TREATMENT BY COMPRESSION.
APTIC-26125 02

COMPUTER PROGRAMS
AUTOMATED DESIGN OF STEEL-FRAME SUPPORTED CHIMNEYS.
APTIC-26015 14

INTERMEDIATE REPORT OF STUDY ON AIR POLLUTION CAUSED BY AUTOMOBILE EXHAUST GAS.
APTIC-26102 05

THE LONG RANGE DIFFUSION OF THE EFFLUENT CLOUD FROM THE PHOEBUS 1B EP-IV REACTOR TEST OF FEBRUARY 23, 1967.
APTIC-26192 05

COMPUTERS
APPLICATIONS OF AEROSPACE TECHNOLOGY IN AIR POLLUTION CONTROL.
APTIC-23866 12

CONCRETE
POWER PLANT ASH--A NEGLECTED ASSET.
APTIC-25689 01

CONDENSATION
DEVELOPMENT OF MOLECULAR CONDENSATION NUCLEI AND CONDITIONS FOR ITS OBSERVATION.
APTIC-24764 06

IMPROVEMENT IN THE PROCESS OF PURIFYING FUMES AND GASES.
APTIC-24785 02

FORMATION OF PARTICLES OF PHOTOLYTIC ORIGIN IN AIR.
APTIC-25564 05

PREPARATION OF RADIOACTIVELY LABELLED CONDENSATION AEROSOLS. I. AEROSOLS OF SODIUM CHLORIDE, SILVER IODIDE AND SULPHURIC

ACID.
APTIC-25801 06

CONDENSATION (ATMOSPHERIC)
CONDENSATION NUCLEI PRODUCTION OF VERY LARGE NUMBERS IN COUNTRY AIR.
APTIC-24843 05

AN EXPERIMENTAL INVESTIGATION OF THE EFFECT OF AIR POLLUTION ON THE INITIATION OF RAIN.
APTIC-25639 05

MEASUREMENT OF PARTICLE-SIZE DISTRIBUTION IN CLOUDS AND FOGS.
APTIC-25955 03

CONIFERS
THE EFFECT OF INDUSTRIAL GASES AND INDUSTRIAL SMOKE ON VARIOUS FOREST SPECIES.
APTIC-24866 08

CONSUMPTION
THE WORLD SUPPLY OF SULFUR.
APTIC-24917 10

CONTACT PROCESSING
HIGH-EFFICIENCY FIBRE FILTERS FOR THE TREATMENT OF FINE MISTS.
APTIC-24695 02

CONTINUOUS AIR MONITORING PROGRAM (CAMP)
CONTINUOUS AIR MONITORING PROJECTS 1968 DATA TABULATIONS AND SUMMARIES, CHICAGO.
APTIC-25803 04

CONTINUOUS AIR MONITORING PROJECTS 1968 DATA TABULATIONS AND SUMMARIES, PHILADELPHIA.
APTIC-25804 04

CONTINUOUS AIR MONITORING PROJECTS 1967 DATA TABULATIONS AND SUMMARIES, DENVER.
APTIC-25805 04

CONTINUES AIR MONITORING PROJECTS 1968 DATA TABULATIONS AND SUMMARIES, CINCINNATI.
APTIC-25817 04

CONTINUOUS AIR MONITORING PROJECTS 1968 DATA TABULATIONS AND SUMMARIES, WASHINGTON, D. C.
APTIC-25818 04

CONTINUOUS AIR MONITORING PROJECTS 1968 DATA TABULATIONS AND SUMMARIES, ST. LOUIS.
APTIC-25992 04

CONTINUOUS MONITORING
THE NEW YORK STATE CONTINUOUS AIR QUALITY MONITORING SYSTEM.
APTIC-23762 03

PERFORMANCE OF A CONTINUOUS COLORIMETRIC AIR MONITOR.
APTIC-24728 03

MEASUREMENT OF AVERAGE PARTICLE SIZE IN AEROSOLS BY LIGHT SCATTERING.
APTIC-24791 03

CONTINUOUS SAMPLING AND ULTRAMICRODETERMINATION OF NITROGEN DIOXIDE IN AIR.
APTIC-24900 03

INSTRUMENTATION AND ANALYTICAL TECHNIQUES FOR THE CONTINUOUS DETERMINATION OF AIR CONTAMINANTS.
APTIC-24927 03

AN AUTOMATIC HYDROGEN FLUORIDE RECORDER PROPOSED FOR INDUSTRIAL HYGIENE AND STACK MONITORING.
APTIC-25647 03

A METHOD FOR THE ESTIMATION OF SULPHUR TRIOXIDE.
APTIC-25940 03

LOW VOLUME AIR SAMPLER RESEARCH ON THE MEASUREMENT OF THE PARTICULATES IN THE AIR WITH LOW VOLUME AIR SAMPLER.
APTIC-26007 03

CONTROL AGENCIES
PROGRESS IN STATE AND LOCAL AIR POLLUTION CONTROL UNDER THE CLEAN AIR ACT.
APTIC-12495 12

ENVIRONMENTAL PROTECTION IN THE CITY OF NEW YORK.
APTIC-24636 12

STRUCTURE AND WORK OF THE AIR POLLUTION CONTROL ADMINISTRATION IN THE FEDERAL REPUBLIC OF GERMANY-EXPERIENCES, PROBLEMS, INTERNATIONAL COMPARISONS.
APTIC-25551 12

CONSIDERATIONS IN DEVELOPING AIR QUALITY CRITERIA.
APTIC-25575 11

AIR POLLUTION CONTROL. ACTIVE RESEARCH GRANTS FOR FISCAL YEAR 1969.
APTIC-25583 12

AIR POLLUTION TRANSLATIONS A BIBLIOGRAPHY WITH ABSTRACTS - VOLUME 2.
APTIC-25930 14

AIR POLLUTION IN THE UNITED STATES.
APTIC-26090 12

FOREIGN PROFILES IN AIR POLLUTION CONTROL ACTIVITIES SPECIAL SOURCES OF INFORMATION.
APTIC-26168 12

HEALTH EFFECTS RESEARCH PROGRAM OF THE NATIONAL AIR POLLUTION CONTROL ADMINISTRATION.
APTIC-26213 12

CONTROL EQUIPMENT
MARKET SITUATION OF POLLUTION CONTROL EQUIPMENT.
APTIC-24650 10

GERMAN FOUNDRY EXPERIENCE IN CUPOLA DUST EMISSION AND EMISSION CONTROL.
APTIC-24674 02

FLUE-GAS WASHING PROCESS. PART TWO.
APTIC-24697 02

GAS CLEANING BY MECHANICAL SEPARATION.
APTIC-24816 02

INDUSTRIAL AIR POLLUTION--ITS CONTROL AND COST.
APTIC-24881 02

APTIC-24881 02

ENGINEERING OUTLINE 94 DUST COLLECTION.
APTIC-24891 02

A PROGRESS REPORT ON CONTROLLING ATMOSPHERIC POLLUTANTS.
APTIC-25590 02

MAINTENANCE AND MANAGEMENT OF AUTOMATIC-TYPE AIR CLEANERS.
APTIC-25723 02

AIR POLLUTION FROM IRONFOUNDRY CUPOLAS.
APTIC-25783 01

DUST REMOVAL, KEEPING AIR CLEAN AND REFUSE DISPOSAL.
APTIC-25860 02

HOW AIR POLLUTION CAN BE CONTROLLED IN A PLANT.
APTIC-25939 02

A METEOROLOGICALLY OPERATED STACK CONTROL SYSTEM.
APTIC-26148 02

MANUFACTURERS' REPORT OF AIR POLLUTION CONTROL EQUIPMENT SALES.
APTIC-26193 10

A BRIEF REVIEW OF FLUE GAS TREATMENT.
APTIC-26195 02

PERFORMANCE TEST METHOD FOR VENTILATOR/AIR PURIFIER (FOR DELETERIOUS GAS), DRAFT.
APTIC-26295 02

CONTROL METHODS
SYSTEMS STUDY OF NITROGEN OXIDE CONTROL METHODS FOR STATIONARY SOURCES.
APTIC-12619 02

EXHAUST BACK PRESSURE CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE.
APTIC-23821 02

RECENT PROCESSES FOR THE REMOVAL OF SULFUR COMPOUNDS FROM GASES, AS SEEN IN GERMAN PATENTS FOR THE YEAR 1964.
APTIC-24594 02

CONTROL OF NITROGEN OXIDE EMISSIONS FROM STATIONARY COMBUSTION SOURCES.
APTIC-24678 02

TREATMENT OF WASTE AIR AND GASES IN THE PROCESS INDUSTRIES.
APTIC-24755 02

CHEMICAL ENGINEERING METHODS FOR REMOVING INORGANIC EMISSIONS.
APTIC-24756 02

DISPOSAL OF FUMES FROM PVC DURING COPPER RECOVERY.
APTIC-24819 02

DIESEL ENGINE EXHAUST SMOKE.
APTIC-24845 01

A PROCESS FOR THE NEUTRALIZATION OF TOXIC VAPOURS AND WASTE GASES.
APTIC-24969 02

SOME EXPERIMENTS FOR CONTROLLING OF NITROGEN OXIDES IN DIESEL ENGINE EXHAUST GAS.
APTIC-25587 02

METALLURGICAL SMOKE.
APTIC-25605 02

ATMOSPHERIC IMPURITIES AND THE PROBLEM OF OBTAINING EXTRA PURE SUBSTANCES.
APTIC-25676 14

ENGINEERING RESEARCH AND DEVELOPMENT IN AIR-POLLUTION CONTROL.
APTIC-25773 02

AIR POLLUTION CAUSED BY AGRICULTURE AND FORESTRY DUST.
APTIC-25976 02

TREATMENT OF DUST GENERATED AT IRON MILL.
APTIC-26003 02

SEMINAR ON 'REMOVAL OF GASES AND DUSTS FROM VENTILATING AIR AND INDUSTRIAL EMISSIONS'.
APTIC-26023 02

AIR POLLUTION.
APTIC-26071 02

TECHNOLOGY OF POLLUTION-CONTROL IN ZINC AND LEAD SMELTING.
APTIC-26107 01

AIR POLLUTION FURNACE TYPES AND SIZES DICTATE MOST EFFECTIVE CONTROLS. PART I.
APTIC-26166 02

DUST AS RAW MATERIAL AS A SOURCE OF LOSS AND OF GAIN.
APTIC-26239 10

CONTROL PROGRAMS
GUIDELINES FOR THE DEVELOPMENT OF AIR QUALITY STANDARDS AND IMPLEMENTATION PLANS.
APTIC-12494 12

PROGRESS IN SMOG CONTROL AT LOS ANGELES.
APTIC-24744 04

PREPARED STATEMENT OF CHARLES C JOHNSON, JR., ADMINISTRATOR, ENVIRONMENTAL HEALTH SERVICE, PUBLIC HEALTH SERVICE, DEPARTMENT OF HEALTH, EDUCATION AND WELFARE.
APTIC-24857 12

A GUIDE TO THE AIR QUALITY ACT OF 1967.
APTIC-24930 12

AIR POLLUTION.
APTIC-25610 12

PROPOSED IMPLEMENTATION PLAN FOR THE CONTROL OF PARTICULATES AND SULFUR OXIDES FOR THE STATE OF OHIO PORTION OF THE METROPOLITAN CINCINNATI INTERSTATE AIR QUALITY CONTROL REGION.
APTIC-25688 12

REPORT ON THE STATE OF AIR POLLUTION IN SWITZERLAND.
APTIC-26135 12

CONTROLLED ATMOSPHERES
LITERATURE REVIEW OF METROPOLITAN AIR POLLUTANT CONCENTRATIONS--PREPARATION, SAMPLING AND ASSAY OF SYNTHETIC ATMOSPHERES. (FINAL REPORT).
APTIC-22812 03

PLANT GROWTH AND LABORATORY ATMOSPHERE.
APTIC-24773 08

AN IMPROVED CONTAMINANT SENSING TECHNIQUE FOR LABORATORY AND SPACECRAFT APPLICATION.
APTIC-24959 03

REAL TIME SIMULATION OF ATMOSPHERIC BALLOON ENVIRONMENT.
APTIC-25823 05

COOLING
PLUME EFFECTS OF NATURAL DRAFT HYPERBOLIC COOLING TOWERS.
APTIC-24835 05

COPPER
CORROSION PRODUCTS IN VARIOUS ENVIRONMENTS.
APTIC-25727 09

COPPER ALLOYS
COMBATTING THE EFFECTS OF SMOG ON WIRE-SPRING RELAYS.
APTIC-25606 09

COPPER COMPOUNDS
RADIOACTIVE COPPER AS AN ATMOSPHERIC TRACER.
APTIC-24914 03

USE OF ELECTROLYSIS TO DETERMINE TRACE AMOUNTS OF LEAD, COPPER, AND ZINC IN STUDIES OF THE ATMOSPHERE.
APTIC-25979 03

CORROSION
ATMOSPHERIC CORROSION OF TALLIUM.
APTIC-24619 09

PROPERTIES OF ELECTROLYTE FILMS IN ATMOSPHERIC CORROSION.
APTIC-24655 09

WATER PERMEABILITY OF RUST LAYER FORMED BY ATMOSPHERIC CORROSION.
APTIC-24671 09

ATMOSPHERIC CORROSION OF ZINC- AND CADMIUM-COATED STEEL AND THE COEFFICIENTS FOR RECALCULATING THE RESULTS OF ACCELERATED CORROSION TESTS INTO DATA FOR SERVICE CONDITIONS.
APTIC-24972 09

CORROSION BEHAVIOR OF CAST IRON IN RURAL, MARINE AND INDUSTRIAL ATMOSPHERES AND IN SEA WATER.
APTIC-25544 09

CORROSION PRODUCTS IN VARIOUS ENVIRONMENTS.
APTIC-25727 09

ROTARY MACHINES FOR EXTREME CLIMATIC CONDITIONS.
APTIC-25741 09

SURVEY OF CORROSION AND ATMOSPHERIC POLLUTION IN AND AROUND SHEFFIELD.
APTIC-25848 09

CURRENT PROBLEMS OF THE THEORY OF ATMOSPHERIC CORROSION.
APTIC-25937 09

COSTS
SYSTEMS STUDY FOR CONTROL OF EMISSIONS. PRIMARY NONFERROUS SMELTING INDUSTRY. (FINAL REPORT). VOLUME II APPENDICES A AND B.
APTIC-12751 02

SYSTEMS STUDY FOR CONTROL OF EMISSIONS. PRIMARY NONFERROUS SMELTING INDUSTRY. (FINAL REPORT). VOL I.
APTIC-12823 02

HERE'S WHAT SO2 REMOVAL COSTS.
APTIC-22444 10

MARKET SITUATION OF POLLUTION CONTROL EQUIPMENT.
APTIC-24650 10

PIPELINE GAS FROM LIGNITE GASIFICATION CURRENT COMMERCIAL ECONOMICS.
APTIC-24727 10

COSTS OF CONTROLLING GRAY IRON CUPOLA EMISSIONS.
APTIC-24827 10

OIL'S U. S. ANITPOLLUTION OUTLAY SURGING.
APTIC-24841 02

COAL CLEANING PLANT PROTOTYPE SPECIFICATIONS A REPORT TO PROCESS CONTROL ENGINEERING DIVISION NATIONAL AIR POLLUTION CONTROL ADMINISTRATION.
APTIC-25820 02

THE ATMOSPHERE TESTING DILEMMA.
APTIC-25821 03

REMOVAL OF SULFUR FROM FUELS AND PRODUCTS OF COMBUSTION.
APTIC-25961 02

MANUFACTURERS' REPORT OF AIR POLLUTION CONTROL EQUIPMENT SALES.
APTIC-26193 10

THE HEALTH COSTS OF AIR POLLUTION.
APTIC-26285 07

COTTONS
OXIDES OF NITROGEN AS A FACTOR IN COLOR CHANGES OF USED AND LAUNDERED COTTON ARTICLES.
APTIC-24608 09

THE EFFECT OF AIR POLLUTANTS ON COTTON.
APTIC-24899 09

CRACKING
OZONE CRACKING OF RUBBERS.
APTIC-24799 09

CORROSION ASPECTS OF AIR POLLUTION IN THE SAN FRANCISCO BAY AREA--RUBBER PRODUCTS.
APTIC-25585 09

COMBATTING THE EFFECTS OF SMOG ON WIRE-SPRING RELAYS.
APTIC-25606 09

CRITERIA
AIR POLLUTANT ANALYSIS.
APTIC-26106 03

CROPS
AIR AS A SOURCE OF LEAD IN EDIBLE CROPS.
APTIC-24947 08

CRUDE OIL
CRUDE OIL FUELS TWO 375-MW UNITS IN JAPAN.
APTIC-25690 01

CRYSTAL STRUCTURE
CRYSTAL STRUCTURE DETERMINATION OF STABLE OZONIDES.
APTIC-25953 06

CUPOLAS
GERMAN FOUNDRY EXPERIENCE IN CUPOLA DUST EMISSION AND EMISSION CONTROL.
APTIC-24674 02

COSTS OF CONTROLLING GRAY IRON CUPOLA EMISSIONS.
APTIC-24827 10

CUPOLA DUST REMOVAL WITH REGARD TO THE PROJECTED STANDARD VDI 2288 ON 'LIMITATION OF DUST EMISSION FROM CUPOLAS'.
APTIC-25548 02

AIR POLLUTION FROM IRONFOUNDRY CUPOLAS.
APTIC-25783 01

ELIMINATION OF POLLUTION CAUSED BY FOUNDRY WORKS.
APTIC-26058 02

TRIAL MODEL OF DUST ELIMINATION DEVICE FOR IRON FOUNDRY CUPOLA.
APTIC-26108 02

CLOSED-TOP CUPOLAS AND AIR CONTAMINATION.
APTIC-26184 02

CYTOGENIC EFFECTS
CYTOGENIC EFFECTS OF FLUORIDE TECHNICAL PROGRESS REPORT.
APTIC-25618 08

DATA ANALYSIS
A PRELIMINARY EXPLORATION OF THE RELATIONSHIP BETWEEN AIR POLLUTION AND CITY DATA.
APTIC-24611 12

APTIC-24611 12

AIR POLLUTION TRANSLATIONS A BIBLIOGRAPHY WITH ABSTRACTS - VOLUME 2.
APTIC-25930 14

DATA HANDLING SYSTEMS
APPLICATIONS OF AEROSPACE TECHNOLOGY IN AIR POLLUTION CONTROL.
APTIC-23866 12

METEOROLOGICAL INSTRUMENTATION FOR AIR POLLUTION APPLICATIONS.
APTIC-25764 05

SOPHISTICATED SYSTEMS REQUIRED TO MONITOR HEAVIER POLLUTION.
APTIC-26256 03

DATA-HANDLING SYSTEMS
AIR QUALITY MODEL SIMULATES TORONTO SKIES.
APTIC-25537 05

DECAY PROCESSES
A STUDY OF THE DECAY PROCESSES IN THE TRIPLET SULFUR DIOXIDE MOLECULE EXCITED AT 3828.0 A.
APTIC-26152 06

DECOMPOSITION
TACKLING THE PROBLEM OF NITROGEN OXIDES.
APTIC-24922 02

REACTION OF NITROGEN OXIDES WITH BIOLOGICALLY IMPORTANT AMINES.
APTIC-25580 06

DENVER
CONTINUOUS AIR MONITORING PROJECTS 1967 DATA TABULATIONS AND SUMMARIES, DENVER.
APTIC-25805 04

DEPOSITION
ATMOSPHERIC PHYSICS. ATMOSPHERIC DIFFUSION, DEPOSITION, AND TRANSPORT. (ANNUAL REPORT).
APTIC-24962 05

THE DEPOSITION OF DUST PARTICLES FROM ELEVATED SOURCES.
APTIC-25648 05

RISE AND GROWTH OF SPACE VEHICLE ENGINE EXHAUST AND ASSOCIATED DIFFUSION MODELS.
APTIC-25685 05

EXPERIMENTAL STUDIES OF INHALED MATERIALS. A BASIS FOR RESPIRATORY MODELS.
APTIC-25883 07

THE DISTRIBUTION OF CARBON, VANADIUM AND NICKEL DEPOSITS ON CATALYST LAYER DURING HYDRODESULFURIZATION PROCESSES OF PETROLEUM RESIDUM.
APTIC-26129 02

DESIGN CRITERIA
CONSTRUCTION OF POWER PLANT STACKS IN THE LIGHT OF PRACTICAL EXPERIENCE.
APTIC-22794 14

DAYTIME TRACKING OF A HIGH-ALTITUDE VAPOR TRAIL.
APTIC-23591 03

PRESSURE DIFFERENTIAL SWITCHES OR REGULATORS FOR THE OPENING AND CLOSING OF ELECTRICAL CONTACTS.
APTIC-24595 06

DESIGN CHARACTERISTICS AND TEST RESULTS OF A NEW MULTICELL FILTER.
APTIC-24642 02

AN ABSORPTION APPARATUS FOR GAS ANALYSIS.
APTIC-24651 03

FLUE-GAS WASHING PROCESS. PART TWO.
APTIC-24697 02

PERFORMANCE OF A CONTINUOUS COLORIMETRIC AIR MONITOR.
APTIC-24728 03

INSTALLATION FOR THE ABSORPTION OF SULFUR DIOXIDE.
APTIC-24750 02

RESEARCH FINDINGS IN STANDARDS OF INCINERATOR DESIGN.
APTIC-24767 02

DRY FIBROUS AIR FILTER MEDIA. PERFORMANCE CHARACTERISTICS.
APTIC-24802 02

IMPROVING THE GAS CLEANING ON 100 T OXYGEN CONVERTERS.
APTIC-24809 02

GAS CLEANING BY MECHANICAL SEPARATION.
APTIC-24816 02

ROTATING CENTRIFUGAL SEPARATOR WITH CONTINUOUS DUST DISCHARGE.
APTIC-24831 02

THE USE OF ELECTROFILTERS IN AIR CONDITIONING.
APTIC-24847 02

CATALYTIC OXIDATION UNIT FOR DOMESTIC OVEN EXHAUST.
APTIC-25554 02

FLARE STACK BURNER ASSEMBLY.
APTIC-25558 02

SELF-SEALING AND SELF-HOLDING FILTER FRAME.
APTIC-25559 02

PROBLEMS OF ELECTRICAL PRECIPITATION REVIEWED.
APTIC-25643 02

SMOKE ABATEMENT DEVICE.
APTIC-25716 02

ELECTROSTATIC FLOCKING APPARATUS.
APTIC-25718 02

ELECTROSTATIC FILTER FOR THE PURIFICATION OF GASES AND PARTICULARLY OF THE AIR.
APTIC-25733 02

FIRST NATURAL GAS LIQUEFACTION PLANT.
APTIC-25748 02

CHARACTERISTICS AND APPLICATION OF HIGH PERFORMANCE DRY FILTERS.
APTIC-25766 02

COAL CLEANING PLANT PROTOTYPE SPECIFICATIONS A REPORT TO PROCESS CONTROL ENGINEERING DIVISION NATIONAL AIR POLLUTION CONTROL ADMINISTRATION.
APTIC-25820 02

ELECTROSTATIC PRECIPITATION FOR LARGE BOILERS.
APTIC-25833 02

ELECTROSTATIC SEPARATOR.
APTIC-25864 02

DEVICE FOR FILTERING SOLIDS FROM A GAS.
APTIC-25908 02

GAS FILTER BAG STRUCTURE.
APTIC-25909 02

A PROCEDURE FOR THE SPECIFICATION OF DISTRIBUTOR PUMPS FOR HIGH VOLUME PRODUCTION.
APTIC-25923 02

HOW AIR POLLUTION CAN BE CONTROLLED IN A PLANT.
APTIC-25939 02

AUTOMATED DESIGN OF STEEL-FRAME SUPPORTED CHIMNEYS.
APTIC-26015 14

OZONE CHEMILUMINESCENT STUDY. FINAL REPORT. PART II. RADIOACTIVE OZONE GENERATOR.
APTIC-26082 03

THE SCA-BILLERUD RECOVERY PROCESS.
APTIC-26171 02

DESIGN AND APPLICATION OF GREASE FILTERS.
APTIC-26186 02

ELECTROSTATIC PRECIPITATOR.
APTIC-26265 02

DESULFURIZATION OF FUELS
METHOD OF ELIMINATING SULFUR COMPOUNDS FROM OIL WITH THE USE OF MICROBES.
APTIC-24641 02

APTIC-24641 02

DISTRIBUTION OF CARBON DIOXIDE AND SULFUR CONTAINING IMPURITIES IN THE GAS DISTRIBUTION STREAM.
APTIC-25547 02

CAN EMISSIONS BE REDUCED
APTIC-25584 02

ON DEVELOPMENT OF DESULFURIZATION TECHNOLOGY ONE OF MITI'S BIG PROJECTS.
APTIC-26005 02

REMOVAL OF SULFUR COMPOUNDS FROM COAL GAS.
APTIC-26211 02

DETROIT
INSTRUMENTATION AND ANALYTICAL TECHNIQUES FOR THE CONTINUOUS DETERMINATION OF AIR CONTAMINANTS.
APTIC-24927 03

EFFECTS OF AIR POLLUTION ON ANIMALS EXPOSED TO STREET ATMOSPHERES IN DETROIT.
APTIC-24964 07

AIR POLLUTION LEVELS ASSOCIATED WITH A 49-HR INVERSION AT DETROIT-WINDSOR.
APTIC-25784 04

DIAGNOSIS

PLEURAL SURFACE PRESSURE IN DOGS.
APTIC-24664 07

BODYPLETHYSMOGRAPHY.
APTIC-24731 07

A COOPERATIVE STUDY OF CERTAIN MEASUREMENTS OF EMPHYSEMA.
APTIC-24804 07

INFLUENCE OF DUST EXPOSURE UPON THE DISTRIBUTION OF ALVEOLAR VENTILATION.
APTIC-25627 07

THE CHEMISTRY, HISTOLOGY, AND ROENTGENOLOGY OF THE TEETH AND BONES OF LARGE ANIMALS.
APTIC-25945 08

DIENES
ADDITION OF DINITROGEN TRIOXIDE TO NONCONJUGATED DIENES.
APTIC-24165 06

DIESEL ENGINES
'AUTOMOTIVE' IS THE DIRTY WORD IN SMOKE EMISSION BS.
APTIC-24677 11

DIESEL ENGINE EXHAUST SMOKE.
APTIC-24845 01

SOME EXPERIMENTS FOR CONTROLLING OF NITROGEN OXIDES IN DIESEL ENGINE EXHAUST GAS.
APTIC-25587 02

AESTHETIC DIESEL SMOKE LEVELS IN BOTH ACCELERATION AND LUG DOWN ARE SET TO BEGIN IN JANUARY 1970.
APTIC-25619 11

EXHAUST EMISSION CHARACTERISTICS OF FOUR-STROKE, DIRECT INJECTION, COMPRESSION IGNITION ENGINES.
APTIC-25922 01

A PROCEDURE FOR THE SPECIFICATION OF DISTRIBUTOR PUMPS FOR HIGH VOLUME PRODUCTION.
APTIC-25923 02

LIGHT OIL AS DIESEL ENGINE FUEL AND ITS PROBLEMS.
APTIC-26048 01

AIR POLLUTION AND ASSOCIATED HEALTH HAZARDS FROM DIESEL LOCOMOTIVE TRAFFIC IN A RAILWAY TUNNEL.
APTIC-26262 01

DIFFUSION
CONJECTURE ON A CONNECTION BETWEEN LIFT AND PARTICLE DISPLACEMENT.
APTIC-24882 06

ATMOSPHERIC PHYSICS. ATMOSPHERIC DIFFUSION, DEPOSITION, AND TRANSPORT. (ANNUAL REPORT).
APTIC-24962 05

DIFFUSION IN ANISOTROPIC FIELD OF TURBULENCE.
APTIC-25755 05

THE DYNAMIC DILUTION OF AEROSOLS BY MIXING WITH CLEAN AIR.
APTIC-25778 02

DEVELOPMENT OF A LASER SYSTEM FOR ABSOLUTE ATMOSPHERIC DIFFUSION MEASUREMENT OF A GASEOUS TRACER MATERIAL. (FINAL REPORT).
APTIC-25936 03

DIFFUSION OF SMOKE FROM A HIGH STACK.
APTIC-26141 05

FLUORESCENT PARTICLES AND THEIR USE IN STUDYING AIR MOTION.
APTIC-26190 05

DIFFUSION MODELS
THE APPLICATION OF TURNER'S CLASSIFICIATION OF DIFFUSION CATEGORIES TO CENTRAL EUROPEAN CLIMATES.
APTIC-12792 05

DEVELOPMENT OF AN ATMOSPHERIC TRANSPORT MODEL.
APTIC-24606 05

ANALYSIS OF LOWER ATMOSPHERIC DATA FOR DIFFUSION STUDIES. (FINAL REPORT).
APTIC-24761 05

AIR QUALITY MODEL SIMULATES TORONTO SKIES.
APTIC-25537 05

THE MAXIMA OF SUTTON'S EQUATION CORRECTED FOR DEPOSITION.
APTIC-25669 05

RISE AND GROWTH OF SPACE VEHICLE ENGINE EXHAUST AND ASSOCIATED DIFFUSION MODELS.
APTIC-25685 05

ENVIRONMENTAL SIMULATION IN AIR POLLUTION CONTROL.
APTIC-25762 05

A PRACTICAL, MULTIPURPOSE URBAN DIFFUSION MODEL FOR CARBON MONOXIDE. (FINAL REPORT).
APTIC-25995 05

THE LONG RANGE DIFFUSION OF THE EFFLUENT CLOUD FROM THE PHOEBUS 1B EP-IV REACTOR TEST OF FEBRUARY 23, 1967.
APTIC-26192 05

METEOROLOGICAL ASPECTS OF AIR POLLUTION AND SIMULATION MODELS OF DIFFUSION, TRANSPORT AND REACTIONS OF AIR POLLUTION TASK FORCE ASSESSMENT.
APTIC-26222 05

DIMETHYL SULFOXIDE
RECOVERY OF SO2.
APTIC-25560 02

DIMETHYLANILINE
ABOUT SULFUR DIOXIDE AND DIMETHYLANILINE.
APTIC-26091 06

DISCOLORATION
OXIDES OF NITROGEN AS A FACTOR IN COLOR CHANGES OF USED AND LAUNDERED COTTON ARTICLES.
APTIC-24608 09

ANTHOCYANIN FORMATION AS A RESPONSE TO OZONE AND SMOG TREATMENT IN RUMEX CRISPUS L.
APTIC-24883 08

DISEASES AND DISORDERS
AIR POLLUTION AND HEALTH.
APTIC-25556 07

BIOLOGICAL ASPECTS OF AIR POLLUTION.
APTIC-25775 07

ECOLOGICAL STATISTICAL STUDIES CONCERNING ENVIRONMENTAL POLLUTION AND CHRONIC DISEASE.
APTIC-25873 07

DISPERSION
DISTRIBUTION OF FUNGAL SPORE TYPES IN SELECTED AREAS IN TEXAS.
APTIC-12613 01

TURBULENT BUOYANT JETS INTO STRATIFIED OR FLOWING AMBIENT FLUIDS.
APTIC-24797 06

MODEL TESTS ON FLOW FROM A BUILDING VENTILATION STACK.
APTIC-24803 05

WIND DIRECTION, VELOCITY AND TURBULENCE INSTRUMENTATION FOR AIR POLLUTION DIAGNOSIS.
APTIC-24862 03

SYMPOSIUM ON THE DISPERSION OF CHIMNEY GASES. II.
APTIC-24869 05

THE ROLE OF DIFFUSIVITY IN TURBULENT DISPERSION.
APTIC-24909 06

RADIOACTIVE COPPER AS AN ATMOSPHERIC TRACER.
APTIC-24914 03

OIL-FIRED AND COAL-FIRED 600-MW BOILER OF THE POWER PLANT AT LE HAVRE.
APTIC-25677 02

RECOMMENDED GUIDE FOR THE PREDICTION OF THE DISPERSION OF AIRBORNE EFFLUENTS.
APTIC-25682 05

THE THEORETICAL CALCULATION OF THE DISTRIBUTION OF PHOTOCHEMICALLY-FORMED OZONE IN THE ATMOSPHERE.
APTIC-25924 05

USE OF ROUTINE METEOROLOGICAL OBSERVATIONS FOR ESTIMATING ATMOSPHERIC DISPERSION.
APTIC-25935 05

ST. LOUIS DISPERSION STUDY. VOLUME I. INSTRUMENTATION, PROCEDURES, AND DATA TABULATIONS.
APTIC-25997 05

DISSIPATION RATES
A TRACER TECHNIQUE TO MEASURE DEPOSITION OF STACK EMISSIONS.
APTIC-26139 03

DISTILLATE OILS
HYDRODESULFURIZATION OF HEAVY PETROLEUM DISTILLATES.
APTIC-25713 02

PILOT-PLANT INVESTIGATIONS OF THE DESULPHURISATION OF LIGHT DISTILLATES.
APTIC-25962 02

DOCK PLANTS
ANTHOCYANIN FORMATION AS A RESPONSE TO OZONE AND SMOG TREATMENT IN RUMEX CRISPUS L.
APTIC-24883 08

DOMESTIC HEATING
THE MEASUREMENT OF EMISSIONS FROM SOLID FUEL HEATING UNIT.
APTIC-25921 03

THE TECHNIQUES OF MEASUREMENT IN THE OIL HEATING CONTROL OF THE CITY OF ZURICH AND THE WAY OF ITS APPLICATION.
APTIC-26137 03

SMALL-SCALE VARIATIONS OF THE CONTAMINATION OF RAIN CAUSED BY WASHOUT FROM THE LOW LAYERS OF THE ATMOSPHERE.
APTIC-26182 05

DOMESTIC OVENS
CATALYTIC OXIDATION UNIT FOR DOMESTIC OVEN EXHAUST.
APTIC-25554 02

DONORA

FLUORINE GASES IN ATMOSPHERE AS INDUSTRIAL WASTE BLAMED FOR DEATH AND CHRONIC POISONING OF DONORA AND WEBSTER, PA., INHABITANTS.
APTIC-24580 07

DOUBLE BRADSHER REACTION
A DOUBLE BRADSHER REACTION.
APTIC-25659 06

DRIFT VELOCITIES
TABLES OF DRIFT VELOCITIES OF SLOW ELECTRONS IN HELIUM, NEON, ARGON, KRYPTON, XENON, HYDROGEN, DEUTERIUM, NITROGEN, CARBON MONOXIDE, CARBON DIOXIDE, WATER VAPOR, NITROUS OXIDE, AND AMMONIA.
APTIC-22661 06

DROPLETS
EVAPORATION RATES AND LIFETIMES OF CLOUDS AND SPRAYS IN AIR. II. THE CONTINUUM MODEL.
APTIC-24890 05

STEADY STATE AND NON-STEADY STATE DIFFUSION THEORY OF DROPLET GROWTH.
APTIC-25634 05

STUDIES ON DROPLET SIZE SPRAYED FROM HOLLOW CONE NOZZLES.
APTIC-26194 06

DRYING
PRACTICAL GAS TREATING. PART 4. HYDROCARBON/EG RATIO IS KEY TO SEPARATION OF EMULSION.
APTIC-24870 02

METHOD AND APPARATUS FOR RECYCLING DRYER STACK GASES.
APTIC-25863 02

DUST FALL
REGIONAL DIFFERENCES IN THE DEPOSITION OF HEAVY METALS OVER SCANDINAVIA.
APTIC-23971 04

ESTIMATION OF THE ANNUAL AVERAGE OF PARTICLE FALL BY MONTHLY VALUES. TOTAL DUSTFALL AND DUSTFALL COMPONENTS.
APTIC-24738 03

DETERMINATION OF DUST FALL WITH GLASS FILTER PANS.
APTIC-24861 03

THE DETERMINATION OF HEAVY METALS IN DUSTFALL BY ATOMIC-ABSORPTION-SPECTROPHOTOMETRY.
APTIC-25535 03

SURVEY OF ACTUAL CONDITIONS OF AIR POLLUTION. 1. AIR POLLUTION IN KEIHIN INDUSTRIAL AREA (1).
APTIC-26130 04

DUSTS
ON THE ROENTGENOLOGICAL DETECTABILITY OF DUST DEPOSITS IN THE LUNGS. STUDIES ON THE ALDERSON-RANDO PHANTOM.
APTIC-18289 06

CALIBRATION OF A TWO-STAGE AIR SAMPLER.
APTIC-22722 03

DUST IN THE CARIBBEAN ATMOSPHERE TRACED TO AN AFRICAN DUST STORM.
APTIC-24632 05

MARKET SITUATION OF POLLUTION CONTROL EQUIPMENT.
APTIC-24650 10

PROBLEMS IN THE GRAVIMETRIC MEASUREMENT OF RESPIRABLE COAL MINE DUST.
APTIC-24656 03

GERMAN FOUNDRY EXPERIENCE IN CUPOLA DUST EMISSION AND EMISSION CONTROL.
APTIC-24674 02

DUST COLLECTION AT ITMANN PREPARATION PLANT.
APTIC-24679 02

A MODIFIED TUBULAR ELECTROFILTER FOR COLLECTING DUST SAMPLES FROM THE AIR.
APTIC-24686 03

DUST FALL IN THE VICINITY OF CEMENT FACTORIES AS IT RELATES TO POSSIBLE HEALTH HAZARDS PART 2.
APTIC-24708 07

AIR POLLUTION MEASUREMENTS. DEVELOPMENTS IN AIR POLLUTION MEASUREMENT.
APTIC-24715 03

CHEMICAL ENGINEERING METHODS FOR REMOVING INORGANIC EMISSIONS.
APTIC-24756 02

PLANT SERVICES BEAT EXPLOSION HAZARDS.
APTIC-24810 02

UNDERSTANDING AIR CLEANER RATING METHODS AIDS ACCURATE SELECTION AND APPLICATION.
APTIC-24872 02

ENGINEERING OUTLINE 94 DUST COLLECTION.
APTIC-24891 02

POSSIBLE CAUSES OF REDUCTION IN DIRECT SOLAR RADIATION.
APTIC-24896 05

AIR POLLUTION IN HOLLAND.
APTIC-24915 02

A STUDY OF ATMOSPHERIC POLLUTION.
APTIC-24945 04

APTIC-24945 04

DUST COLLECTION IN INDUSTRY.
APTIC-25538 02

ASSESSING THE DEGREE OF EXPOSURE TO DUST AND OCCUPATIONAL EPIDEMIOLOGY.
APTIC-25543 07

CUPOLA DUST REMOVAL WITH REGARD TO THE PROJECTED STANDARD VDI 2288 ON 'LIMITATION OF DUST EMISSION FROM CUPOLAS'.
APTIC-25548 02

DE-DUSTING DEVICE FOR SMOKE AND OTHER GASEOUS FLUIDS.
APTIC-25550 02

SPIROGRAM AND WASH-OUT CURVE DO THESE METHODS DISCRIMINATE BETWEEN THE EFFECTS OF DUST INHALATION AND SMOKING UPON LUNG VENTILATION.
APTIC-25576 07

INFLUENCE OF DUST EXPOSURE UPON THE DISTRIBUTION OF ALVEOLAR VENTILATION.
APTIC-25627 07

THE DEPOSITION OF DUST PARTICLES FROM ELEVATED SOURCES.
APTIC-25648 05

IMPROVEMENTS IN OR RELATING TO DUST TRAPS FOR USE IN THE EXAMINATION OF DUST-LADEN GAS.
APTIC-25664 03

MOBILE DUST AND DEBRIS COLLECTION AND INERTIAL DUST SEPARATOR FOR AIRPORT RUNWAYS AND/OR STREET CLEANING.
APTIC-25709 02

GAMMA RAY SPECTROMETRY OF THE NATURAL RADIOACTIVITY IN THE AIRBORNE DUST.
APTIC-25758 04

CENTRIFUGE SEDIMENTATION SIZE ANALYSIS OF SAMPLES OF AIRBORNE DUSTS COLLECTED IN MEMBRANE FILTERS.
APTIC-25843 03

A NEW SEDIMENTATION METHOD FOR DUST SPECIMENS.
APTIC-25869 03

CLEANING OF DUST SEPARATING APPARATUS.
APTIC-25892 02

DOSING OF SMALL AMOUNTS OF DUST BY MEANS OF A DOSATOR WITH A GRANULAR BASE.
APTIC-25906 08

COLLECTION OF GAS-BORNE DUST PARTICLES BY MEANS OF AN ASPIRATED SAMPLING NOZZLE.
APTIC-25957 03

EFFECT OF FILTER MEDIA MICROSTRUCTURE ON DUST COLLECTION.
APTIC-25960 02

THE PROBLEM OF CEMENT FACTORY DUST FROM THE AGRICULTURAL STANDPOINT.
APTIC-25964 08

MICROSCOPIC IDENTIFICATION OF TOXIC DUSTS.
APTIC-25970 03

AIR POLLUTION CAUSED BY AGRICULTURE AND FORESTRY DUST.
APTIC-25976 02

TREATMENT OF DUST GENERATED AT IRON MILL.
APTIC-26003 02

ATMOSPHERIC DUSTS COLLECTED OFF THE WEST AFRICAN COAST.
APTIC-26016 04

CHEMICAL COMPOSITION OF FINELY-DISPERSED DUST FORMED DURING BLOWING OXYGEN THROUGH THE MELT IN THE HEARTH OF A STEEL FURNACE. 1ST COMMUNICATION.
APTIC-26018 02

DUST AND SOOT NUISANCES AT A METALLURGICAL COKING PLANT AND IN ITS ENVIRONMENT.
APTIC-26040 01

ELIMINATION OF POLLUTION CAUSED BY FOUNDRY WORKS.
APTIC-26058 02

ELECTRIC FILTERS FOR DRY AND WET SEPARATION.
APTIC-26063 02

STUDY ON THE WET-TYPE COLLECTOR USED ON THE PROCESS FOR THE PRODUCTION OF SLAKED LIME.
APTIC-26072 02

METHODS OF SAMPLING SUSPENDED DUST FOR MEASURING THE FREE SILICA CONTENT.
APTIC-26076 03

INTRATRACHEAL ADMINISTRATION OF DUST PARTICLES AND CARCINOGENS IN RATS.
APTIC-26099 07

TRIAL MODEL OF DUST ELIMINATION DEVICE FOR IRON FOUNDRY

CUPOLA.
APTIC-26108 02

STUDY OF PULMONARY DUST DEPOSITS WITH ELECTRON MICROSCOPE AND MICROANALYSIS WITH AN ELECTRONIC PROBE.
APTIC-26110 07

THE PRODUCTION OF TRANSPARENT PROFILES OF DUST PARTICLES AS AN AID TO AUTOMATIZED PARTICLE COUNTING.
APTIC-26183 03

DUST AS RAW MATERIAL AS A SOURCE OF LOSS AND OF GAIN.
APTIC-26239 10

CONTAMINATION OF DAIRY FEEDS BY AIR POLLUTION.
APTIC-26276 08

GAS SCRUBBING IN THE HYDRODYNAMIC DUST SEPARATOR DURING ELECTROLYSIS OF ALUMINUM.
APTIC-26279 02

THE CASCADE CENTRIPETER FOR THE PARTICLE SIZE DETERMINATION AND ITS APPLICATION TO THE CHEMICAL ANALYSIS BY THE RING OVEN.
APTIC-26292 03

ECONOMIC LOSSES
THE CALAVERAS CEMENT CO. DUST SUIT.
APTIC-25642 12

LEGISLATING FOR AIR QUALITY MANAGEMENT REDUCING THEORY TO PRACTICE.
APTIC-26205 12

DUST AS RAW MATERIAL AS A SOURCE OF LOSS AND OF GAIN.
APTIC-26239 10

EDUCATION
TWO SPEECHES MADE BY MONSIEUR GEORGES POMPIDOU PRESIDENT OF THE FRENCH REPUBLIC.
APTIC-25730 13

EFFICIENCY
UNDERSTANDING AIR CLEANER RATING METHODS AIDS ACCURATE SELECTION AND APPLICATION.
APTIC-24872 02

ELECTRIC CHARGE
ON THE INTERACTION OF AEROSOL PARTICLES WITH ACOUSTIC WAVE IN THE PRESENCE OF HIGH FREQUENCY ELECTRIC FIELD.
APTIC-24624 06

THEORETICAL COLLISION EFFICIENCIES OF CHARGED CLOUD DROPLETS.
APTIC-24662 05

ENEMIES IN THE AIR.
APTIC-24920 02

PROBLEMS IN AEROSOL FILTRATION.
APTIC-25539 02

CONDUCTION AND PUMPING IN DIELECTRIC LIQUIDS UNDER THE INFLUENCE OF AN APPLIED ELECTRIC FIELD.
APTIC-25684 06

CONTRIBUTION TO THE THEORY OF ELECTRICAL CHARGING OF AN AEROSOL.
APTIC-25980 06

PRECIPITATION CHARACTERISTICS SHIPBOARD MEASUREMENTS IN THE CARIBBEAN SEA.
APTIC-26162 05

ELECTRIC POWER PRODUCTION
CONSTRUCTION OF POWER PLANT STACKS IN THE LIGHT OF PRACTICAL EXPERIENCE.
APTIC-22794 14

A LOAD SHIFTING MODEL FOR AIR POLLUTION CONTROL IN THE ELECTRIC POWER INDUSTRY.
APTIC-24681 02

POLLUTION FROM COMBUSTION OF FOSSIL FUELS.
APTIC-24732 01

PROBLEMS SET BY ATMOSPHERIC POLLUTION IN JAPAN.
APTIC-24826 01

CONTROL OF POWER PLANT EMISSIONS.
APTIC-24837 02

A STUDY OF ATMOSPHERIC POLLUTION.
APTIC-24945 04

APTIC-24945 04

UTILITY RESPONSIBILITY FOR PROTECTION OF THE ENVIRONMENT.
APTIC-24951 01

COMBUSTION POWER UNIT -- 400 CPU-400.
APTIC-24954 02

CAN EMISSIONS BE REDUCED
APTIC-25584 02

POWER, POLLUTION, AND THE IMPERILED ENVIRONMENT. II. EAST, MIDWEST, AND WEST COAST POLLUTION-CONTROL PLANS OF SOME MAJOR UTILITIES ROLE OF GOVERNMENT IN ENVIRONMENTAL MATTERS OTHER PROPOSED SYSTEMS FOR REDUCING STACK EMISSIONS.
APTIC-25867 02

DIFFUSION OF SMOKE FROM A HIGH STACK.
APTIC-26141 05

ELECTRICAL CONTACTS
PRESSURE DIFFERENTIAL SWITCHES OR REGULATORS FOR THE OPENING AND CLOSING OF ELECTRICAL CONTACTS.
APTIC-24595 06

ELECTRICAL PROPERTIES
ELECTRIC PROPERTIES OF ICE FOG CRYSTALS.
APTIC-24663 05

HEAT TRANSFER AND OTHER EFFECTS OF AN ELECTRIC FIELD ON A PARALLEL FLOW HYDROCARBON DIFFUSION FLAME.
APTIC-24800 06

ELECTRODYNAMIC BEHAVIOR OF CHARGED AEROSOL PARTICLES IN AN INHOMOGENEOUS ALTERNATING FIELD AND POSSIBILITIES OF ITS APPLICATION IN DUST ENGINEERING.
APTIC-26041 06

ELECTRICAL RESISTANCE
IMPROVEMENTS RELATING TO METHODS OF AND INSTRUMENTS FOR MEASURING THE CONCENTRATION OF COMBUSTIBLE GAS IN AN AIR SAMPLE.
APTIC-26245 03

ELECTRICITY (ATMOSPHERIC)
THE IONS OF THE TROPOSPHERE THEIR INTERACTIONS WITH AEROSOLS AND THE GEOELECTRIC FIELD.
APTIC-26080 05

ELECTROCARDIOGRAPH
A NEW GLUE HOLDS RIGID CUP ECG SKIN ELECTRODES FOR 24 HOURS AND LONGER.
APTIC-25626 07

ELECTROCHEMICAL METHODS
USE OF ELECTROLYSIS TO DETERMINE TRACE AMOUNTS OF LEAD, COPPER, AND ZINC IN STUDIES OF THE ATMOSPHERE.
APTIC-25979 03

ELECTROCONDUCTIVITY ANALYZERS
LOW-VELOCITY GAS-LIQUID IMPINGER FOR THE CONTINUOUS ESTIMATION OF SULPHUR DIOXIDE AND OTHER ATMOSPHERIC POLLUTANTS.
APTIC-25851 03

INSTRUMENTATION IN POLLUTION CONTROL.
APTIC-25990 03

A 'PERSONAL' MEASURING INSTRUMENT FOR ATMOSPHERIC SULPHUR DIOXIDE.
APTIC-26257 03

ELECTRODES
ENEMIES IN THE AIR.
APTIC-24920 02

ELECTROLYSIS
CONVERSION OF SULFUR DIOXIDE TO SULFUR TRIOXIDE.
APTIC-25651 02

ELECTROCHEMICAL PROCESS FOR RECOVERING SULFUR VALUES.
APTIC-25913 02

USE OF ELECTROLYSIS TO DETERMINE TRACE AMOUNTS OF LEAD, COPPER, AND ZINC IN STUDIES OF THE ATMOSPHERE.
APTIC-25979 03

GAS SCRUBBING IN THE HYDRODYNAMIC DUST SEPARATOR DURING ELECTROLYSIS OF ALUMINUM.
APTIC-26279 02

ELECTRON MICROSCOPY
METHOD AND EQUIPMENT FOR MAKING PREPARATIONS OF MICROSCOPIC PARTICLES OF SOLID SUBSTANCES.
APTIC-24598 03

INVESTIGATION WITH THE ELECTRON MICROSCOPE OF AEROSOLS COLLECTED ON MEMBRANE FILTERS.
APTIC-24770 03

APTIC-24770 03

HEALTH EFFECTS OF PARTICULATE AIR POLLUTION CHARACTERIZATION OF COMPACT AND FIBROUS COMPONENTS.
APTIC-25582 03

ELECTROSTATIC PRECIPITATORS
FACTORS INFLUENCING THE EFFICIENT OPERATION OF ELECTROSTATIC PRECIPITATORS FOR PULVERISED-FUEL ASH.
APTIC-24630 02

TRENDS OF CLEANING SUPPLY AND EXHAUST AIR IN PROCESS ENGINEERING.
APTIC-24654 02

THE NEW 'HOT' ELECTROSTATIC PRECIPITATOR.
APTIC-24675 02

SELECTION OF GAS CLEANING EQUIPMENT FOR AN ORE PREPARATION PLANT.
APTIC-24676 02

A MODIFIED TUBULAR ELECTROFILTER FOR COLLECTING DUST SAMPLES FROM THE AIR.
APTIC-24686 03

  ANALYSIS OF SPACE-CHARGE PRECIPITATION.
  APTIC-24794 02

  THE USE OF ELECTROFILTERS IN AIR CONDITIONING.
  APTIC-24847 02

  SEPARATION OF PLASTICIZER MISTS IN THE PROCESSING OF PVC MIXTURES.
  APTIC-24937 02

  DE-DUSTING DEVICE FOR SMOKE AND OTHER GASEOUS FLUIDS.
  APTIC-25550 02

  HEALTH EFFECTS OF PARTICULATE AIR POLLUTION CHARACTERIZATION OF COMPACT AND FIBROUS COMPONENTS.
  APTIC-25582 03

  IMPROVEMENTS IN OR RELATING TO DEVICES FOR CLEANING EXHAUST GASES.
  APTIC-25599 02

  PRELIMINARY EVALUATION OF CEMENT DUST FROM ELECTROFILTERS AS A POTASSIUM FERTILIZER.
  APTIC-25609 02

  CHARACTERISTICS OF ELECTROSTATIC PRECIPITATORS.
  APTIC-25641 02

  PROBLEMS OF ELECTRICAL PRECIPITATION REVIEWED.
  APTIC-25643 02

  ELECTROSTATIC CONDITIONING ARRANGEMENT.
  APTIC-25711 02

  ELECTROSTATIC FLOCKING APPARATUS.
  APTIC-25718 02

  STUDY ON THE REMOVAL EFFICIENCY OF SO2 GASES BY A WET-TYPE ELECTRIC PRECIPITATOR.
  APTIC-25720 02

  THE MAINTENANCE AND PRESERVATION OF THE EFFICIENCY OF AN ELECTRIC AIR-CLEANING DEVICE.
  APTIC-25724 02

  ELECTROSTATIC FILTER FOR THE PURIFICATION OF GASES AND PARTICULARLY OF THE AIR.
  APTIC-25733 02

  EFFICIENCY OF ELECTROSTATIC PRECIPITATORS AS AFFECTED BY THE PROPERTIES AND COMBUSTION OF COAL.
  APTIC-25786 02

  ELECTROSTATIC PRECIPITATION FOR LARGE BOILERS.
  APTIC-25833 02

  ELECTROSTATIC SEPARATOR.
  APTIC-25864 02

  THE BEHAVIOR OF THE AIR GERM COUNT IN AN ELECTROSTATIC FIELD.
  APTIC-25877 02

  MAINTENANCE AND MANAGEMENT OF AIR-CLEANING DEVICES IN OFFICE BUILDINGS.
  APTIC-25915 02

  GAS FILTER.
  APTIC-26022 02

  ELECTRIC FILTERS FOR DRY AND WET SEPARATION.
  APTIC-26063 02

  PRESENT PERFORMANCE AND SCOPE FOR IMPROVEMENT IN POWER-STATION ELECTROSTATIC PRECIPITATORS.
  APTIC-26143 02

  THE ABSOLUTE EFFICIENCY OF THE IMPINGER AND OF THE ELECTROSTATIC PRECIPITATOR IN THE SAMPLING OF AIR CONTAINING METALLIC LEAD FUME.
  APTIC-26145 03

  POWER AND INDUSTRY   PARTICULATES.
  APTIC-26233 02

  ELECTROSTATIC PRECIPITATOR.
  APTIC-26265 02

  TOSHIBA ELECTROSTATIC AIR FILTER.
  APTIC-26296 02

EMISSION INVENTORIES
  PARKERSBURG, WEST VIRGINIA--MARIETTA, OHIO, AIR POLLUTION ABATEMENT ACTIVITY   SUPPLEMENTAL TECHNICAL REPORT.
  APTIC-25780 04

EMISSION STANDARDS
  THE CALIFORNIA TEST. FIGHT AGAINST AIR POLLUTION BY MEANS OF CONTROL MEASURES APPLICABLE TO NEW AUTOMOBILES IN THE U.S.A.
  APTIC-24859 12

  THE MEASUREMENT OF AIR POLLUTION AND THE ESTABLISHMENT OF CRITERIA FOR THE EVALUATION OF AIR QUALITY.
  APTIC-24907 11

  CUPOLA DUST REMOVAL WITH REGARD TO THE PROJECTED STANDARD VDI 2288 ON 'LIMITATION OF DUST EMISSION FROM CUPOLAS'.
  APTIC-25548 02

  AESTHETIC DIESEL SMOKE LEVELS IN BOTH ACCELERATION AND LUG DOWN ARE SET TO BEGIN IN JANUARY 1970.
  APTIC-25619 11

  PROTECTION AGAINST IMMISSION.
  APTIC-25638 02

  PROPOSED IMPLEMENTATION PLAN FOR THE CONTROL OF PARTICULATES AND SULFUR OXIDES FOR THE STATE OF INDIANA PORTION OF THE METROPOLITAN CINCINNATI INTERSTATE AIR QUALITY CONTROL REGION.
  APTIC-25998 12

EMPHYSEMA
  A COOPERATIVE STUDY OF CERTAIN MEASUREMENTS OF EMPHYSEMA.
  APTIC-24804 07

ENFORCEMENT PROCEDURES
  THE MISDEMEANOR APPROACH TO POLLUTION CONTROL.
  APTIC-25597 12

ENGINE DESIGN MODIFICATION
  ANOTHER NEW ENGINE NUDGES DETROIT.
  APTIC-24968 02

  AUTOMOTIVE ENGINE DESIGNING AND GASOLINE.
  APTIC-26038 01

ENGINE EXHAUSTS
  EXHAUST BACK PRESSURE CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE.
  APTIC-23821 02

  AIRCRAFT GAS TURBINE ENGINE EXHAUST SMOKE MEASUREMENT.
  APTIC-24581 03

  ALTERNATING CURRENT POLAROGRAPHIC ANALYSIS OF LEAD IN AUTOMOBILE EXHAUST GAS.
  APTIC-24617 03

  RAPID ANALYSIS OF LEAD IN AUTOMOBILE EXHAUST GAS.
  APTIC-24618 03

  APTIC-24618 03

  AIR POLLUTION BY GAS TURBINES -- IS CONTROL POSSIBLE
  APTIC-24631 02

  MEASUREMENT OF AUTOMOBILE EXHAUST GAS.
  APTIC-24638 03

  MEASURING METHOD OF AIR POLLUTANTS DUE TO AUTOMOBILE EXHAUST.
  APTIC-24644 03

  AN INVENTORY OF AUTOMOBILE GASES.
  APTIC-24700 01

  MOTOR EXHAUST COMPOSITION IN RELATION TO SELECTED FUELS.
  APTIC-24729 01

  MEASURING GASEOUS EMISSIONS FROM AN AIRCRAFT TURBINE ENGINE.
  APTIC-24745 03

  THE REACTION OF ETHANE IN SPARK IGNITION ENGINE EXHAUST GAS.
  APTIC-24747 01

  THE DISAPPEARANCE OF ETHYLENE, PROPYLENE, N-BUTANE, AND 1-BUTANE IN SPARK-IGNITION ENGINE EXHAUST.
  APTIC-24748 01

  LEAD IN EXHAUST GASES.
  APTIC-24757 04

  THE SHARE OF AUTOMOBILE EXHAUST GASES IN AIR POLLUTION.
  APTIC-24783 01

  POLLUTION OF CULTIVATED PLANTS WITH LEAD FROM AUTO EXHAUST.
  APTIC-24788 08

  ENGINE EXHAUST GAS PURIFICATION DEVICE.
  APTIC-24822 02

  MOTOR FUMES AND ATMOSPHERIC POLLUTION.
  APTIC-24961 07

  WATER INJECTOR FOR ENGINE EXHAUST.
  APTIC-25557 02

  THE EFFECTS OF LEAD ADDITIVES ON REACTIONS IN EXHAUST SYSTEMS.
  APTIC-25581 01

  SOME EXPERIMENTS FOR CONTROLLING OF NITROGEN OXIDES IN DIESEL ENGINE EXHAUST GAS.
  APTIC-25587 02

  GASSING....THE BUG-A-BOO OF THE BUS BUSINESS.
  APTIC-25594 03

  IMPROVEMENTS IN OR RELATING TO DEVICES FOR CLEANING EXHAUST GASES.
  APTIC-25599 02

  EQUILIBRATION AND STEAM-REFORMING CATALYSTS.
  APTIC-25601 02

  SAMPLE HANDLING SYSTEM FOR AUTO EXHAUST ANALYZER.
  APTIC-25732 03

  GAS TESTING PROCESS FOR SMOG FORMING CONSTITUTENTS.
  APTIC-25734 03

AN EXPERIMENT STUDY ON EXHAUST GASES OF KEROSENE WITH VEHICLE ENGINE.
APTIC-25754 01

EXHAUST EMISSION CHARACTERISTICS OF FOUR-STROKE, DIRECT INJECTION, COMPRESSION IGNITION ENGINES.
APTIC-25922 01

ENGINE OPERATING CYCLES
DISCUSSION OF 'A STATISTICAL APPROACH TO DESCRIBING VEHICULAR DRIVING CYCLES'. F. BECKLEY SMITH, JR., W. A. P. MEYER, AND R. U. AYRES, SAE PAPER NO. 690212.
APTIC-12771 06

THE EXCESS FUEL CONSUMED BY CARS WHEN STARTING FROM COLD.
APTIC-24605 01

APPARATUS FOR REDUCING HYDROCARBON CONTENT OF ENGINE EXHAUST GASES DURING DECELERATION OF AUTOMOBILE.
APTIC-25540 02

AN ANALYSIS OF THE DRIVING PATTERN IN THE METROPOLITAN AREA. PART II.
APTIC-25725 01

AN ANALYSIS OF THE DRIVING PATTERN IN METROPOLITAN AREA. PART I.
APTIC-25726 01

ENGINE OPERATION MODIFICATION
AUTOMOTIVE ENGINE DESIGNING AND GASOLINE.
APTIC-26038 01

ALDEHYDES, POLYNUCLEAR AROMATIC HYDROCARBONS, AND ATMOSPHERIC LEAD.
APTIC-26269 02

ENGLISH TRANSLATIONS
AIR POLLUTION TRANSLATIONS A BIBLIOGRAPHY WITH ABSTRACTS- VOLUME I.
APTIC-12493 14

ENZYMES
ESTIMATION OF SMALL AMOUNTS OF FLUORIDE IN BODY FLUIDS.
APTIC-24720 07

DISTURBANCE OF ACID-BASE AND ENZYME EQUILIBRIUM IN EXPERIMENTAL INTOXICATION WITH SO2 AND PROTECTIVE ACTION OF AMMONIA.
APTIC-26138 07

EPIDEMIOLOGY
AIR POLLUTION I. INTRODUCTION.
APTIC-24670 07

NASOPHARYNGEAL CARCINOMA AND ENVIRONMENTAL CARCINOGENS.
APTIC-24880 07

ASSOCIATED HEALTH IMPLICATIONS IN AIR-POLLUTION CONTROL.
APTIC-24910 07

SUMMARIES OF LITERATURE RELATED TO AIR POLLUTION.
APTIC-24918 07

ASSESSING THE DEGREE OF EXPOSURE TO DUST AND OCCUPATIONAL EPIDEMIOLOGY.
APTIC-25543 07

NITROGEN DIOXIDE POISONING IN SILO ATMOSPHERES. (SILO-FILLERS' DISEASE).
APTIC-25586 07

THE ROLE OF 3 4-BENZPYRENE IN THE EPIDEMIOLOGY OF LUNG CANCER.
APTIC-25613 07

TESTS TO ASSESS EFFECTS OF LOW LEVELS OF AIR POLLUTANTS ON HUMAN HEALTH.
APTIC-25874 07

POSSIBLE EFFECTS OF AIR POLLUTION ON THE COURSE OF INFECTIOUS RESPIRATORY DISEASE.
APTIC-25999 07

EFFECT OF AIR POLLUTION ON THE INHABITANTS IN OMUTA WITH SPECIAL REFERENCE TO THE FINDINGS OF LUNG FUNCTION AND CHEST X-RAY FILM.
APTIC-26024 07

THE INFLUENCE OF AIR POLLUTION ON RESPIRATORY APPARATUS OF THE INHABITANTS OF BOTH OTAKE AND KUBE CITIES.
APTIC-26025 07

REPORT ON THE EPIDEMIOLOGICAL INVESTIGATION OF THE HEALTH EFFECTS OF AIR POLLUTION AND REPORT ON THE INVESTIGATION OF INFANT DEATHS IN THE YOKKAICHI DISTRICT.
APTIC-26169 07

EQUIPMENT CRITERIA
RESPIRATOR FILTER PENETRATION USING SODIUM CHLORIDE AEROSOL.
APTIC-25611 03

THE TECHNIQUES OF MEASUREMENT IN THE OIL HEATING CONTROL OF THE CITY OF ZURICH AND THE WAY OF ITS APPLICATION.
APTIC-26137 03

EQUIPMENT STANDARDS
'AUTOMOTIVE' IS THE DIRTY WORD IN SMOKE EMISSION BS.
APTIC-24677 11

EXAMINATION OF THE BEHAVIOR OF HIGH VOLTAGE INSULATORS UNDER POLLUTION CONDITIONS, USING A CONVENTIONAL TESTING METHOD, WITH PARTICULAR REFERENCE TO THE SELF-CLEANING APTITUDE.
APTIC-25926 11

EROSION
AIR POLLUTION CAUSED BY AGRICULTURE AND FORESTRY DUST.
APTIC-25976 02

ESTERS
PRELIMINARY INVESTIGATIONS ON THE BIOSYNTHESIS OF METHYL ESTERS OF FATTY ACIDS IN RHIZOPUS ARRHIZUS FISCHER.
APTIC-12755 06

REMOVAL OF SO2 GAS.
APTIC-25742 02

ETHANE
THE REACTION OF ETHANE IN SPARK IGNITION ENGINE EXHAUST GAS.
APTIC-24747 01

ETHYLENE
OXIDATION OF ETHYLENE BY THE PHOTOLYSIS OF NO2 AT 25 C.
APTIC-25941 06

ETHYLENE GLYCOL
METHOD TO REMOVE SULFUR DIOXIDE FROM ATMOSPHERIC AIR OR WASTE GAS.
APTIC-24812 02

ETHYLENE GLYCOL (EG)
PRACTICAL GAS TREATING. PART 4. HYDROCARBON/EG RATIO IS KEY TO SEPARATION OF EMULSION.
APTIC-24870 02

EUROPE
THE APPLICATION OF TURNER'S CLASSIFICIATION OF DIFFUSION CATEGORIES TO CENTRAL EUROPEAN CLIMATES.
APTIC-12792 05

THE IMPORTANCE OF INVESTIGATING GLOBAL BACKGROUND POLLUTION.
APTIC-23959 04

INFORMATION ON DAMAGE CAUSED BY AIR POLLUTION TO THE PLANTS AND ANIMALS IN EUROPEAN COUNTRIES.
APTIC-24933 08

ORGANIZATION OR DEVELOPMENT OF EUROPEAN COOPERATION IN RESEARCH, STANDARDIZATION, AND DOCUMENTATION CONCERNING THE CAMPAIGN AGAINST AIR POLLUTION.
APTIC-25628 14

EUROPEAN LEGISLATION ON POLLUTION AND WASTE DISPOSAL.
APTIC-26070 12

FOREIGN PROFILES IN AIR POLLUTION CONTROL ACTIVITIES SPECIAL SOURCES OF INFORMATION.
APTIC-26168 12

EVAPORATION
EVAPORATION RATES AND LIFETIMES OF CLOUDS AND SPRAYS IN AIR. II. THE CONTINUUM MODEL.
APTIC-24890 05

EXCESS AIR
FORMATION AND THEIR PREVENTION OF ACID SMUTS AT OIL FIRED BOILER.
APTIC-24817 02

POWER AND INDUSTRY CONTROL OF NITROGEN OXIDE EMISSIONS.
APTIC-26226 02

POWER AND INDUSTRY CONTROL OF CARBON MONOXIDE EMISSIONS.
APTIC-26232 02

EXHAUST MANIFOLD THERMAL REACTOR
EXHAUST MANIFOLD THERMAL REACTORS - A SOLUTION TO THE AUTOMOTIVE EMISSIONS PROBLEM.
APTIC-24722 02

EXHAUST SYSTEMS
DUST COLLECTION IN INDUSTRY.
APTIC-25538 02

MAINTENANCE AND MANAGEMENT OF AIR-CLEANING DEVICES IN FACTORIES.
APTIC-25889 02

EXPOSURE CHAMBERS
PAINT INDUSTRY SMOG CHAMBER. I. DESIGN AND VALIDATION OF A SMOG CHAMBER.
APTIC-24711 07

DOSING OF SMALL AMOUNTS OF DUST BY MEANS OF A DOSATOR WITH A GRANULAR BASE.
APTIC-25906 08

A DEVICE FOR THE PROLONGED AND REPEATED EXPOSURE OF ANIMALS TO CARBON MONOXIDE. (CHRONIC CARBON MONOXIDE POISONING SERIES II).
APTIC-26236 07

EXTINCTION COEFFICIENTS
THE WAVELENGTH DEPENDENCE OF ATMOSPHERIC EXTINCTION.
APTIC-24658 05

EYE IRRITATION
EYE IRRITATION FROM AIR POLLUTION.
APTIC-24710 07

PAINT INDUSTRY SMOG CHAMBER. I. DESIGN AND VALIDATION OF A

SMOG CHAMBER.
APTIC-24711 07

A STUDY OF THE EFFECTS OF AIR POLLUTANTS ON THE EYE.
APTIC-25756 07

EYES
THE EFFECT OF AIR POLLUTANTS ON THE EYE. I. THE EFFECT OF AN ORGANIC EXTRACT ON THE CONJUNCTIVAL GOBLET CELLS.
APTIC-25703 07

EXPERIMENTAL CARBON MONOXIDE POISONING ITS ELECTROPHYSIOLOGICAL EFFECTS ON THE VISUAL PATHWAY IN CATS.
APTIC-25836 07

FADING
GAS FADING OF ACETATE AND TRIACETATE PRINTS.
APTIC-24781 09

EFFECT OF ATMOSPHERIC CONTAMINANTS ON LIGHTFASTNESS TESTING.
APTIC-24906 09

ADVANCES IN THEORETICAL AND PRACTICAL STUDIES OF GAS FADING.
APTIC-24965 09

A COMPARISON OF THE EFFECT ON RAYON FABRICS OF VARIOUS GASES UNDER CONTROLLED CONDITIONS.
APTIC-25772 09

A COMPARISON OF METHODS FOR TESTING THE FASTNESS TO GAS FADING OF DYES ON ACETATE.
APTIC-26167 03

FANS (BLOWERS)
HOSPITAL INFECTION.
APTIC-25890 01

FARMS
ON PROTECTION AGAINST EMISSION REMOVAL OF OFFENDING SMELLS.
APTIC-25858 02

FATTY ACIDS
FATTY ACID ANALYSIS OF CEREBROSPINAL FLUID OF CHICKEN.
APTIC-12616 06

PRELIMINARY INVESTIGATIONS ON THE BIOSYNTHESIS OF METHYL ESTERS OF FATTY ACIDS IN RHIZOPUS ARRHIZUS FISCHER.
APTIC-12755 06

FEASIBILITY STUDIES
DEVELOPMENT OF A LASER SYSTEM FOR ABSOLUTE ATMOSPHERIC DIFFUSION MEASUREMENT OF A GASEOUS TRACER MATERIAL. (FINAL REPORT).
APTIC-25936 03

FEATHERS
QUALITATIVE ANALYSES OF ODOR COMPONENTS IN THE PYROLYSIS OF FEATHER IN THE LABORATORY TEST.
APTIC-26014 02

FEDERAL GOVERNMENTS
APPLICATIONS OF AEROSPACE TECHNOLOGY IN AIR POLLUTION CONTROL.
APTIC-23866 12

EXAMPLES OF TECHNOLOGY ASSESSMENTS FOR THE FEDERAL GOVERNMENT.
APTIC-24604 12

A SUMMARY OF FEDERAL, STATE AND LOCAL AIR POLLUTION LAWS.
APTIC-24855 12

PREPARED STATEMENT OF CHARLES C JOHNSON, JR., ADMINISTRATOR, ENVIRONMENTAL HEALTH SERVICE, PUBLIC HEALTH SERVICE, DEPARTMENT OF HEALTH, EDUCATION AND WELFARE.
APTIC-24857 12

AIR POLLUTION ABATEMENT PROCEDURES UNDER THE CLEAN AIR ACT.
APTIC-24948 12

SUMMARY OF THE AIR QUALITY ACT OF 1967.
APTIC-24950 12

CONSIDERATIONS IN DEVELOPING AIR QUALITY CRITERIA.
APTIC-25575 11

AIR POLLUTION CONTROL. ACTIVE RESEARCH GRANTS FOR FISCAL YEAR 1969.
APTIC-25583 12

ROLE OF THE FEDERAL GOVERNMENT IN AIR POLLUTION CONTROL.
APTIC-25595 12

AIR POLLUTION.
APTIC-25610 12

AIR POLLUTION, PRE-EMPTION, LOCAL PROBLEMS AND THE CONSTITUTION--SOME PIGEONHOLES AND HATRACKS.
APTIC-25671 12

TWO SPEECHES MADE BY MONSIEUR GEORGES POMPIDOU PRESIDENT OF THE FRENCH REPUBLIC.
APTIC-25730 13

THE HUNDRED MEASURES.
APTIC-25731 12

THE RELATIONSHIP OF TECHNOLOGY ASSESSMENT TO ENVIRONMENTAL MANAGEMENT.
APTIC-25782 12

REPORT ON THE STATE OF AIR POLLUTION IN SWITZERLAND.
APTIC-26135 12

HEALTH EFFECTS RESEARCH PROGRAM OF THE NATIONAL AIR POLLUTION CONTROL ADMINISTRATION.
APTIC-26213 12

FERTILIZER MANUFACTURING
MONITORING OF FLUORIDE CONTENT OF AIR, WATER, AND VEGETATION.
APTIC-24801 04

FERTILIZING
PRELIMINARY EVALUATION OF CEMENT DUST FROM ELECTROFILTERS AS A POTASSIUM FERTILIZER.
APTIC-25609 02

FETUS
ENVIRONMENTAL INFLUENCE ON INTRAUTERINE LUNG DEVELOPMENT.
APTIC-26207 07

FIBER FILTERS
TEMPERATURE CHARACTERISTICS OF FIBRE FILTERS.
APTIC-25798 02

FILTER FABRICS
HIGH-EFFICIENCY FIBRE FILTERS FOR THE TREATMENT OF FINE MISTS.
APTIC-24695 02

FINE FILTRATION OF PROCESS AND WASTE GASES FROM LEAD PRODUCTION WITH THE AID OF JET BLAST BAG FILTERS.
APTIC-24771 02

DRY FIBROUS AIR FILTER MEDIA. PERFORMANCE CHARACTERISTICS.
APTIC-24802 02

SMOKE ABATEMENT DEVICE.
APTIC-25716 02

ESTIMATION FOR INITIAL COLLECTION EFFICIENCY OF A FIBROUS MAT FILTER.
APTIC-26301 02

FILTER MICROSTRUCTURE
EFFECT OF FILTER MEDIA MICROSTRUCTURE ON DUST COLLECTION.
APTIC-25960 02

FILTERS
ON THE ROLE OF BROWNIAN VIBRATIONS OF ULTRATHIN FIBERS IN AEROSOL FILTRATION.
APTIC-24840 02

UNDERSTANDING AIR CLEANER RATING METHODS AIDS ACCURATE SELECTION AND APPLICATION.
APTIC-24872 02

TRIBUTARY VENTILATION WITH A FOAM FILTER.
APTIC-24887 02

PROBLEMS IN AEROSOL FILTRATION.
APTIC-25539 02

AIR POLLUTION CONTROL DEVICE FOR ENGINES.
APTIC-25566 02

FILTER FRAME SEAL.
APTIC-25571 02

RESPIRATOR FILTER PENETRATION USING SODIUM CHLORIDE AEROSOL.
APTIC-25611 03

STANDARD METHODS OF FILTER TESTING.
APTIC-25674 02

FLY ASH AIDS IN SLUDGE DISPOSAL.
APTIC-25694 02

CHARACTERISTICS AND APPLICATION OF HIGH PERFORMANCE DRY FILTERS.
APTIC-25766 02

A FILTER PAPER METHOD FOR LEAD FUME COLLECTION.
APTIC-25793 03

FURTHER APPLICATIONS OF THE LIMED FILTER PAPER TECHNIQUE IN FLUORINE AIR POLLUTION STUDIES.
APTIC-25816 03

CLEANING OF DUST SEPARATING APPARATUS.
APTIC-25892 02

GAS FILTER.
APTIC-26022 02

SIMULTANEOUS SO2 AND FLY ASH REMOVAL.
APTIC-26073 02

FIRING METHODS
FLAME GRID AND COMPONENT PARTS THEREOF.
APTIC-23819 02

SULFUR OXIDES BY OIL-FIRING.
APTIC-26119 02

FISH
OCCURRENCE OF AIRBORNE LEAD IN SAN FRANCISCO BAY AND ITS RELATION TO ANIMAL DISEASE.
APTIC-25967 08

FLAME
HEAT TRANSFER AND OTHER EFFECTS OF AN ELECTRIC FIELD ON A PARALLEL FLOW HYDROCARBON DIFFUSION FLAME.
APTIC-24800 06

FLAME AFTERBURNERS
BURNER MEANS FOR ELIMINATING SMOKE.
APTIC-25570 02

FLAME IONIZATION DETECTOR
SAFETY IN AIR SEPARATION PLANTS DETERMINATION OF ATMOSPHERIC POLLUTANTS BY GAS CHROMATOGRAPHY.
APTIC-24592 03

MEASUREMENT OF AUTOMOBILE EXHAUST GAS.
APTIC-24638 03

IONIZATION-CHROMATOGRAPHIC DETERMINATION OF NITRILES IN THE 6ATMOSPHERE.
APTIC-24693 03

SAMPLE HANDLING SYSTEM FOR AUTO EXHAUST ANALYZER.
APTIC-25732 03

FLAME SPREAD
PROPAGATION VELOCITY AND FLAME SPREAD THROUGH SIMULATED FUEL BEDS.
APTIC-25989 06

FLOATING BEDS
APPARATUS FOR EFFECTING INTIMATE CONTACT BETWEEN A GAS AND A LIQUID.
APTIC-25600 02

FLORIDA
MONITORING OF FLUORIDE CONTENT OF AIR, WATER, AND VEGETATION.
APTIC-24801 08

FLOUR PROCESSING
PLANT SERVICES HEAT EXPLOSION HAZARDS.
APTIC-24810 02

FLOW RATES
GAS DYNAMICS OF ACCELERATING PARTICULATE FLOW IN CIRCULAR DUCTS.
APTIC-24726 06

EXPERIMENTS ON ANISOKINETIC SAMPLING ERRORS FOR SOLID-LIQUID TWO-PHASE FLOW.
APTIC-25574 03

ABSORPTION OF SULFUR DIOXIDE IN A VENTURI TUBE.
APTIC-25760 02

THE THERMAL FORCE IN THE TRANSITION REGION.
APTIC-25832 06

ANALYTICAL METHODS FOR DETERMINATION OF AEROSOLS WITH HELP OF MEMBRANE ULTRAFILTERS. VI. ON THE MECHANISM OF MEMBRANE ULTRAFILTER ACTION.
APTIC-25956 03

FLOWMETERS
METER FOR DETERMINING MASS FLOW OF SOLIDS IN MULTI-PHASE FLUIDS.
APTIC-24590 06

FLUID FLOW
TURBULENT BUOYANT JETS INTO STRATIFIED OR FLOWING AMBIENT FLUIDS.
APTIC-24797 06

THE EQUILIBRIUM FLOW OF A GAS-PARTICLE SYSTEM.
APTIC-24860 06

STUDY OF ATMOSPHERIC AND AAP OBJECTIVES OF CROSS-BEAM EXPERIMENTS. (FINAL REPORT).
APTIC-24924 03

A STUDY OF THE MECHANICS OF TURBULENT GAS-SOLID SHEAR FLOWS.
APTIC-25657 06

CONDUCTION AND PUMPING IN DIELECTRIC LIQUIDS UNDER THE INFLUENCE OF AN APPLIED ELECTRIC FIELD.
APTIC-25684 06

A STUDY OF THE POSSIBLE MOVEMENT OF MICROORGANISMS THROUGH SMALL ORIFICES. (FINAL REPORT).
APTIC-25687 06

FLUORANTHENES
ANALYSIS OF POLYCYCLIC HYDROCARBONS IN PARTICULATE POLLUTANTS.
APTIC-25920 03

FLUORENES
ANALYSIS OF POLYCYCLIC HYDROCARBONS IN PARTICULATE POLLUTANTS.
APTIC-25920 03

FLUORESCENCE
APPLICATION OF HETEROGENEITY EFFECTS ENCOUNTERED IN THE ABSORPTION AND EMISSION OF X-RAYS TO ON-STREAM SENSING OF VARIABLES SUCH AS PARTICLE SIZE.
APTIC-24600 03

FLUORESCENCE AND PHOSPHORESCENCE OF SO2 VAPOR.
APTIC-24894 06

CHEMILUMINESCENT METHOD OF DETECTING OZONE.
APTIC-25710 03

DETECTION OF POLLEN FLAVONOIDS BY FLUORESCENCE ON IMPREGNATED PAPERS.
APTIC-25928 03

FLUORESCENT PARTICLES AND THEIR USE IN STUDYING AIR MOTION.
APTIC-26190 05

FLUORIDES
ESTIMATION OF SMALL AMOUNTS OF FLUORIDE IN BODY FLUIDS.
APTIC-24720 07

FLUORIDE CONCENTRATIONS IN THE AMBIENT AIR.
APTIC-24736 08

SOME DATA ON THE WATER BALANCE IN PLANTS IN THE PRESENCE OF FLUOR IN THE SUBSTRATE.
APTIC-24787 08

MONITORING OF FLUORIDE CONTENT OF AIR, WATER, AND VEGETATION.
APTIC-24801 08

EFFECT OF COLD STORAGE ON THE FLUORIDE CONTENT OF ALFALFA.
APTIC-24886 03

CYTOGENIC EFFECTS OF FLUORIDE TECHNICAL PROGRESS REPORT.
APTIC-25618 08

FLUORIDE BOILERS.
APTIC-25631 03

SPECTROPHOTOMETRIC DETERMINATION OF FLUORIDE ION.
APTIC-25668 03

AIR POLLUTION AND SOUTHERN FORESTS.
APTIC-25769 08

CURRENT INFORMATION ON THE QUANTITIES OF FLUORIDE FOUND IN AIR, FOOD, AND WATER.
APTIC-25806 03

FURTHER APPLICATIONS OF THE LIMED FILTER PAPER TECHNIQUE IN FLUORINE AIR POLLUTION STUDIES.
APTIC-25816 03

INORGANIC FLUORIDES.
APTIC-25913 11

THE EFFECTS OF THE ABSORPTION OF FLUORIDE. V. THE CHEMICAL DETERMINATION OF FLUORIDE IN HUMAN SOFT TISSUES FOLLOWING PROLONGED INGESTION OF FLUORIDE AT VARIOUS LEVELS.
APTIC-25946 07

SPECTROPHOTOMETRIC DETERMINATION OF BERYLLIUM AND FLUORIDE USING CHROME AZUROL S.
APTIC-25952 03

PRESENT SITUATION AND OUTLOOK OF FLUORIDES AIR POLLUTION PREVENTION TECHNOLOGY--TACKLING WITH ALUMINUM SMELTING POLLUTION.
APTIC-26136 01

AIR POLLUTION FROM FLUORIDES.
APTIC-26258 01

CELLULOSE SUPPORTED THORIUM-ALIZARIN RED S REAGENT FOR FLUORIDE ION DETERMINATION.
APTIC-26259 03

FLUORINATED HYDROCARBONS
MICRO-PARR ASSEMBLY SUITABLE FOR MICRODETERMINATION OF FLUORINE IN ORGANIC COMPOUNDS.
APTIC-25752 03

FLUORINE
METHOD FOR THE REMOVAL OF FLUORINE FROM INDUSTRIAL GASES.
APTIC-25658 02

FLUORINE COMPOUNDS
FLUORINE GASES IN ATMOSPHERE AS INDUSTRIAL WASTE BLAMED FOR DEATH AND CHRONIC POISONING OF DONORA AND WEBSTER, PA., INHABITANTS.
APTIC-24580 07

MEASUREMENT OF ATMOSPHERIC FLUORINE. ANALYSES OF RAIN WATERS AND SPANISH MOSS EXPOSURES.
APTIC-24717 08

FLUORIDE RECOVERY FROM PHOSPHORUS PRODUCTION.
APTIC-24834 02

COMPARISON OF THE EFFECTS OF SULPHUR DIOXIDE AND OF THE DERIVATIVES OF FLUORINE ON A FEW PLANTS.
APTIC-24852 08

INFORMATION ON DAMAGE CAUSED BY AIR POLLUTION TO THE PLANTS AND ANIMALS IN EUROPEAN COUNTRIES.
APTIC-24933 08

THE MICRODETERMINATION OF FLUORIDE IN VEGETATION.
APTIC-24966 03

METHODS OF FLUORINE AND FLUORIDE ANALYSIS - I.
APTIC-25615 03

METHODS OF FLUORINE AND FLUORIDE ANALYSIS - II.
APTIC-25616 03

METHODS OF FLUORINE AND FLUORIDE ANALYSIS - III.

APTIC-25617 03

TERMINAL PROGRESS REPORT ON PUBLIC HEALTH SERVICE RESEARCH GRANT AP00349, 1/1/64 TO 12/31/68.
APTIC-25636 06

THE INFLUENCE OF FLUORINE EXHALATION ON THE FLORA IN THE SURROUNDINGS OF AN ALUMINUM PLANT.
APTIC-25661 08

THE EFFECT OF FLUORINE EXHALATION ON ANIMALS IN THE SURROUNDINGS OF AN ALUMINUM PLANT.
APTIC-25665 08

THE EFFECT OF FLUORINE ON DAIRY CATTLE. V. FLUORINE IN THE URINE AS AN ESTIMATOR OF FLUORINE INTAKE.
APTIC-25735 08

FLUOROSIS
LEVELS OF TOXICITY TO ANIMALS PROVIDE SOUND BASIS FOR FLUORIDE STANDARDS.
APTIC-24944 08

THE EFFECT OF FLUORINE EXHALATION ON ANIMALS IN THE SURROUNDINGS OF AN ALUMINUM PLANT.
APTIC-25665 08

THE CHEMISTRY, HISTOLOGY, AND ROENTGENOLOGY OF THE TEETH AND BONES OF LARGE ANIMALS.
APTIC-25945 08

FLY ASH
FACTORS INFLUENCING THE EFFICIENT OPERATION OF ELECTROSTATIC PRECIPITATORS FOR PULVERISED-FUEL ASH.
APTIC-24630 02

POWER PLANT ASH--A NEGLECTED ASSET.
APTIC-25689 01

FLY ASH AIDS IN SLUDGE DISPOSAL.
APTIC-25694 02

SIMULTANEOUS SO2 AND FLY ASH REMOVAL.
APTIC-26073 02

FOOD AND FEED OPERATIONS
DETAILED DETERMINATION OF NITROGEN COMPOUNDS CONTAINED IN WASTE GASES.
APTIC-24682 03

AIR POLLUTION CAUSED BY AGRICULTURE AND FORESTRY ODOR.
APTIC-25977 02

ODOR CONTROL IN FISH AND BONE MEAL FACTORIES IN NORTH EUROPE. (III). (DE LAVAL SYSTEM AND ATV SYSTEM).
APTIC-26002 02

CONCERN TO INFLUENCE OF AERIAL BACTERIUM, ESPECIAL, ABOUT PATHOGENIC STAPHYLOCOCCUS E.
APTIC-26012 01

RESEARCH ON ODOR CONTROL IN THE U.S.A. (A CHAPTER OF RENDERING PLANTS IN WEST COAST).
APTIC-26057 12

ROLE OF THE DAIRY AND FOOD INDUSTRY IN ENVIRONMENTAL POLLUTION CONTROL.
APTIC-26277 01

FOODS
FOOD IN A CARCINOGENIC ENVIRONMENT.
APTIC-25704 07

EFFECTS ON RAT OF CHRONC EXPOSURE OF LOW CONCENTRATION OF CO. PART I.
APTIC-26133 07

FORESTS
THE IMPORTANCE OF PROTECTIVE PLANTINGS AGAINST AIR POLLUTANTS.
APTIC-24730 02

FORMALDEHYDES
AN EXAMPLE OF FORMALDEHYDE GAS CONTROL PROJECT.
APTIC-26074 02

FORMIC ACID
REMOVAL OF SO2 GAS.
APTIC-25742 02

FORT HUACHUCA
STATISTICAL REPORT OF AEROALLERGENS (POLLENS AND MOLDS) FORT HUACHUCA, ARIZONA 1969.
APTIC-25679 04

FORT WAYNE
AN ANALYSIS OF TURBULENCE STATISTICS AT FORT WAYNE, INDIANA.
APTIC-25916 05

FRANCE
TWO SPEECHES MADE BY MONSIEUR GEORGES POMPIDOU PRESIDENT OF THE FRENCH REPUBLIC.
APTIC-25730 13

THE HUNDRED MEASURES.
APTIC-25731 12

FUEL ADDITIVES
LEADED OR NON-LEADED GASOLINE...WHAT ARE THE FACTS
APTIC-24829 02

THE HYGIENIC ASPECTS OF THE PRODUCTION AND USE OF LEAD ANTIKNOCK COMPOUNDS.
APTIC-24876 07

LEAD AND AIR POLLUTION AN ANALYSIS OF THE MORSE REPORT.
APTIC-24877 01

THE EFFECTS OF LEAD ADDITIVES ON REACTIONS IN EXHAUST SYSTEMS.
APTIC-25581 01

EFFECTS OF GASOLINE ADDITIVES ON CARBURETOR AND PCV SYSTEMS PERFORMANCE AS THEY RELATE TO EXHAUST EMISSIONS.
APTIC-26200 02

FUEL EVAPORATION
ADJUST SPARK ADVANCE TO CONTROL HOX.
APTIC-26017 02

HYDROCARBON CONTROL FOR LOS ANGELES BY REDUCING GASOLINE VOLATILITY.
APTIC-26199 02

FUEL GASES
PRACTICAL GAS TREATING. PART 4. HYDROCARBON/EG RATIO IS KEY TO SEPARATION OF EMULSION.
APTIC-24870 02

DISTRIBUTION OF CARBON DIOXIDE AND SULFUR CONTAINING IMPURITIES IN THE GAS DISTRIBUTION STREAM.
APTIC-25567 02

REMOVAL OF SULFUR COMPOUNDS FROM COAL GAS.
APTIC-26211 02

FUEL OIL PREPARATION
MICROBIAL REMOVAL OF SULFIDE CONTAINED IN PETROLEUM.
APTIC-25101 02

TRICKLING PACKED BED REACTORS.
APTIC-26065 02

GULF METHOD.
APTIC-26066 02

SULFUR OXIDES BY OIL-FIRING.
APTIC-26119 02

ON HYDROCRACKING DESULFURIZATION CATALYST FOR RESIDUAL OIL.
APTIC-26132 02

ON UOP RCD ISOMAX METHOD.
APTIC-26133 02

POWER AND INDUSTRY CONTROL OF SULFUR DIOXIDE EMISSIONS.
APTIC-26230 02

FUEL OILS
CONTROL OF POWER PLANT EMISSIONS.
APTIC-24837 02

CONVERSION OF URBAN REFUSE TO OIL.
APTIC-25753 02

EXAMPLES OF CITY-GAS COMBUSTION IN BOILERS.
APTIC-25868 02

LIGHT OIL AS DIESEL ENGINE FUEL AND ITS PROBLEMS.
APTIC-26048 01

SULFUR OXIDES BY OIL-FIRING.
APTIC-26119 02

FUEL TANK EVAPORATION
EVAPORATIVE EMISSIONS CONTROLS IMPROVED IN '71 MODELS.
APTIC-24625 02

FUELS
COAL AND CLEAN AIR.
APTIC-23726 01

POLLUTION FROM COMBUSTION OF FOSSIL FUELS.
APTIC-24732 01

METAL HYDRIDES AS A SOURCE OF FUEL FOR VEHICULAR PROPULSION.
APTIC-24746 02

ANALYSIS OF LOWER ATMOSPHERIC DATA FOR DIFFUSION STUDIES. (FINAL REPORT).
APTIC-24761 05

DEVELOPMENT OF HIGH SPEED BURNER.
APTIC-24824 02

SULFUR IN IRON- AND STEELMAKING.
APTIC-24928 01

SOOT OBTAINED FROM SOLID FUELS.
APTIC-25545 01

THE RISE OF BOUYANT CLOUDS.
APTIC-25819 05

FUMES
VENTILATION AT NON-FERROUS MELTING AND POURING OPERATIONS.
APTIC-24607 02

TREATMENT OF WASTE AIR AND GASES IN THE PROCESS INDUSTRIES.
APTIC-24755 02

DISPOSAL OF FUMES FROM PVC DURING COPPER RECOVERY.

APTIC-24819 02

A PROCESS FOR THE NEUTRALIZATION OF TOXIC VAPOURS AND WASTE GASES.
APTIC-24969 02

MODERN AUTOMATIC BAGHOUSES FOR COLLECTION OF LEAD-FURNACE FUMES.
APTIC-25781 02

A FILTER PAPER METHOD FOR LEAD FUME COLLECTION.
APTIC-25793 03

HOW AIR POLLUTION CAN BE CONTROLLED IN A PLANT.
APTIC-25939 02

THE ABSOLUTE EFFICIENCY OF THE IMPINGER AND OF THE ELECTROSTATIC PRECIPITATOR IN THE SAMPLING OF AIR CONTAINING METALLIC LEAD FUME.
APTIC-26145 03

NEW PENNSALT HF PLANT.
APTIC-26248 02

FUNGI
DISTRIBUTION OF FUNGAL SPORE TYPES IN SELECTED AREAS IN TEXAS.
APTIC-12613 01

INCORPORATION OF ACETATE-1-C14 INTO ALKANES, FATTY ACIDS, METHYL ESTERS AND FREE FATTY ACIDS OF SPORES AND MYCELIUM OF RHIZOPUS ARRHIZUS.
APTIC-12614 06

LIPID COMPONENTS OF SCLEROTIA OF SCLEROTINIA SCLEROTIORUM.
APTIC-12615 06

THE RELATIONSHIPS OF OZONE, LOPHODERMIUM PINASTRI AND PULLULARIA PULLULANS TO NEEDLE BLIGHT OF EASTERN WHITE PINE.
APTIC-24796 08

STATISTICAL REPORT OF AEROALLERGENS (POLLENS AND MOLDS) FORT HUACHUCA, ARIZONA 1969.
APTIC-25679 04

FIRST OBSERVATIONS ABOUT ATMOSPHERIC ALLERGIC FUNGI IN SOUTHERN AND EASTERN BELGIUM.
APTIC-25876 04

STUDIES ON AIRBORNE FUNGAL FLORA. PART II. STUDY ON AIRBORNE FUNGI IN REFERENCE TO ATMOSPHERIC FACTORS AND AIR POLLUTION.
APTIC-26307 04

FURNACES
DEVELOPMENT OF HIGH SPEED BURNER.
APTIC-24824 02

LIQUEFIED NATURAL GAS AS INDUSTRIAL FUEL.
APTIC-25893 02

AIR POLLUTION FURNACE TYPES AND SIZES DICTATE MOST EFFECTIVE CONTROLS. PART I.
APTIC-26166 02

A CENTRALIZED INCINERATION FACILITY FOR INDUSTRIAL WASTE DISPOSAL.
APTIC-26204 02

GAMMA RADIATION
GAMMA RAY SPECTROMETRY OF THE NATURAL RADIOACTIVITY IN THE AIRBORNE DUST.
APTIC-25758 04

GAS CHROMATOGRAPHY
FATTY ACID ANALYSIS OF CEREBROSPINAL FLUID OF CHICKEN.
APTIC-12616 06

DETERMINING THE COMPOSITION OF RAW BENZENE BY GAS-LIQUID CHROMATOGRAPHY.
APTIC-24621 03

PALLADIUM DEVICES FOR GAS CHROMATOGRAPHY.
APTIC-24665 03

SINGLE DETECTOR AND FORECOLUMN TRAP FOR SERIES GAS-CHROMATOGRAPHY ANALYSIS.
APTIC-24699 03

STUDY OF THE ATMOSPHERIC POLYCYCLIC HYDROCARBONS. I. PROBLEMS CONNECTED WITH THE COUPLING OF THIN-LAYER CHROMATOGRAPHY AND GAS CHROMATOGRAPHY.
APTIC-24705 03

RADIO FREQUENCY GAS CHROMATOGRAPHIC DETECTORS.
APTIC-24765 03

CHEMISTRY OF SMELL.
APTIC-24814 03

SIMULTANEOUS DETERMINATION OF CARBON AND SULFUR IN ORGANIC COMPOUNDS BY GAS CHROMATOGRAPHY.
APTIC-24901 03

AN IMPROVED CONTAMINANT SENSING TECHNIQUE FOR LABORATORY AND SPACECRAFT APPLICATION.
APTIC-24959 03

A SENSITIVE PROCEDURE FOR DETERMINING CARBON MONOXIDE IN BLOOD OR TISSUE UTILIZING GAS-SOLID CHROMATOGRAPHY.
APTIC-26252 07

GAS FADING INHIBITORS
GAS FADING OF ACETATE AND TRIACETATE PRINTS.
APTIC-24781 09

GAS SAMPLING
ANALYTICAL METHODS USED TO DETERMINE DAMAGE BY ACIDS IN THE ATMOSPHERE.
APTIC-24970 03

GAS TURBINES
AIRCRAFT GAS TURBINE ENGINE EXHAUST SMOKE MEASUREMENT.
APTIC-24581 03

AIR POLLUTION BY GAS TURBINES -- IS CONTROL POSSIBLE
APTIC-24631 02

TURBINE-POWERED BUSES. HOW GAS TURBINES WORK.
APTIC-24811 02

COMBUSTION POWER UNIT -- 400 CPU-400.
APTIC-24954 02

GASES
TABLES OF DRIFT VELOCITIES OF SLOW ELECTRONS IN HELIUM, NEON, ARGON, KRYPTON, XENON, HYDROGEN, DEUTERIUM, NITROGEN, CARBON MONOXIDE, CARBON DIOXIDE, WATER VAPOR, NITROUS OXIDE, AND AMMONIA.
APTIC-22681 06

STATUS REPORT.
APTIC-23503 03

THE EQUILIBRIUM FLOW OF A GAS-PARTICLE SYSTEM.
APTIC-24860 06

THE EFFECT OF SPECIFIC INDUSTRIAL GASES ON THE GROWTH OF SOME TREE SPECIES.
APTIC-24864 08

THE INFLUENCE OF SMOKE AND GAS ON THE FLOWERING AND FRUITING OF SOME TREES AND SHRUBS.
APTIC-24865 08

ATTEMPT TO DEFINE THE EXPOSURE LIMITS OF CONCENTRATION FOR SO2, CL2, H2S, AND THE NITROGEN OXIDES IN AN URBAN ATMOSPHERE.
APTIC-24941 11

A STUDY OF THE MECHANICS OF TURBULENT GAS-SOLID SHEAR FLOWS.
APTIC-25657 06

GASIFICATION (SYNTHESIS)
PIPELINE GAS FROM LIGNITE GASIFICATION CURRENT COMMERCIAL ECONOMICS.
APTIC-24727 10

A REACTION WHICH PERMITS THE CYCLIC USE OF CALCINED DOLOMITE TO DESULFURIZE FUELS UNDERGOING GASIFICATION.
APTIC-24762 02

THE WESTERN COAL DEPOSITS A NATIONAL SOURCE OF POWER.
APTIC-24955 01

GASIFICATION PROCESS USING ASPHALT AS RAW MATERIAL.
APTIC-26011 02

GASOLINES
THE EXCESS FUEL CONSUMED BY CARS WHEN STARTING FROM COLD.
APTIC-24605 01

FLAME PHOTOMETRIC DETERMINATION OF LEAD AND MANGANESE IN GASOLINE.
APTIC-24719 03

MOTOR EXHAUST COMPOSITION IN RELATION TO SELECTED FUELS.
APTIC-24729 01

LEADED OR NON-LEADED GASOLINE...WHAT ARE THE FACTS
APTIC-24829 02

LEAD AND AIR POLLUTION AN ANALYSIS OF THE MORSE REPORT.
APTIC-24877 01

AUTOMOTIVE STARTING AND WARM-UP RESPOND TO GASOLINE VOLATILITY.
APTIC-25931 01

STATE OF AFFAIRS AND PROBLEMS INVOLVING AUTOMOTIVE FUEL GASOLINE.
APTIC-26100 01

EFFECTS OF GASOLINE ADDITIVES ON CARBURETOR AND PCV SYSTEMS PERFORMANCE AS THEY RELATE TO EXHAUST EMISSIONS.
APTIC-26200 02

GAS-LIQUID CONTACT
APPARATUS FOR EFFECTING INTIMATE CONTACT BETWEEN A GAS AND A LIQUID.
APTIC-25600 02

GAS-SOLID CHROMATOGRAPHY
ANALYSIS OF BLAST FURNACE GAS BY GAS-SOLID CHROMATOGRAPHY.
APTIC-25654 03

GA-SE-TE SYSTEM
LIQUIDUS CURVE OF THE GA-SE-TE SYSTEMS.
APTIC-25675 06

GENETICS
INTERACTION OF BENZO(A)PYRENE (BAP) WITH MAMMALIAN CELLS IN

CULTURE.
APTIC-25850 07

GERMANY
THE 1968 ANNUAL REPORT OF THE STATE INSTITUTE FOR IMMISSION AND SOIL PROTECTION OF THE STATE OF NORDRHEIN-WESTFALEN IN ESSEN.
APTIC-24612 12

MARKET SITUATION OF POLLUTION CONTROL EQUIPMENT.
APTIC-24650 10

DETERMINATION OF DUST FALL WITH GLASS FILTER PANS.
APTIC-24861 03

INDUSTRY, ENVIRONMENT AND ENVIRONMENTAL PROTECTION.
APTIC-25541 12

STRUCTURE AND WORK OF THE AIR POLLUTION CONTROL ADMINISTRATION IN THE FEDERAL REPUBLIC OF GERMANY-EXPERIENCES, PROBLEMS, INTERNATIONAL COMPARISONS.
APTIC-25551 12

PROTECTION OF ENVIRONMENT.
APTIC-25593 04

CONSIDERATIONS ON IMPROVING THE ENVIRONMENTAL PROTECTION.
APTIC-26061 12

AN ARTICLE DEALING WITH SULFUR DIOXIDE EMISSIONS AND THEIR EFFECTS ON VEGETATION.
APTIC-26174 08

GLASS FABRICS
THE AMOUNT OF SULPHUR TRIOXIDE ACCUMULATED ON FIBRE-GLASS FILTERS USED FOR DETERMINING DUST CONTENT IN FLUE GASES.
APTIC-24584 03

DETERMINATION OF DUST FALL WITH GLASS FILTER PANS.
APTIC-24861 03

LIQUID MIST COLLECTION.
APTIC-25717 02

FEASIBILITY OF FABRIC FILTER AS GAS-SOLID CONTACTOR TO CONTROL GASEOUS POLLUTANTS. (FINAL REPORT).
APTIC-25785 02

FIBER MIST ELIMINATORS FOR HIGHER VELOCITIES.
APTIC-26095 02

GRANTS
AIR POLLUTION CONTROL. ACTIVE RESEARCH GRANTS FOR FISCAL YEAR 1969.
APTIC-25583 12

GRAPES
SENSITIVITY OF GRAPEVINES TO INJURY BY ATMOSPHERIC SULFUR DIOXIDE.
APTIC-25888 08

GRAPHITE
ADSORPTION OF HYDROCARBONS ON GRAPHITIZED CARBON.
APTIC-25621 02

GRAVITATIONAL FIELD
SIMULTANEOUS PHYSICAL SINGULARITY IN SPACE FILLED BY DUST-LIKE MEDIUM.
APTIC-25749 06

GRAVITY SETTLING
A NEW ROAD TO ACCELERATED GRAIN-SIZE ANALYSIS IN THE RANGE FROM 10 MICRON TO 0.1 MICRON IN DIAMETER.
APTIC-26060 03

GREASE FILTERS
DESIGN AND APPLICATION OF GREASE FILTERS.
APTIC-26106 02

GREAT BRITAIN
'AUTOMOTIVE' IS THE DIRTY WORD IN SMOKE EMISSION BS.
APTIC-24677 11

THE WORK OF AN OCCUPATIONAL HYGIENE SERVICE IN ENVIRONMENTAL CONTROL.
APTIC-25767 07

THE GROWTH OF PUBLIC OPINION.
APTIC-25776 13

CONTROL OF SPECIAL INDUSTRIAL EMISSIONS IN BRITAIN.
APTIC-25879 12

GROUND LEVEL
CONCERNING INDIRECT DETERMINATION OF THE REPEATABILITY OF LARGE-SCALE NEAR-GROUND INVERSIONS IN CITIES OF SIBERIA.
APTIC-25811 05

GYPSUM
WASTE GYPSUM INTO USEFUL PRODUCTS.
APTIC-24646 02

HAIR
HAIR TRACE METAL LEVELS AND ENVIRONMENTAL EXPOSURE.
APTIC-24716 07

HALOGENATED HYDROCARBONS
VOLATILE TOXIC COMPOUNDS.
APTIC-25598 03

HARBORS
OCCURRENCE OF AIRBORNE LEAD IN SAN FRANCISCO BAY AND ITS RELATION TO ANIMAL DISEASE.
APTIC-25967 08

HAZE
SPECTRAL TRANSPARENCY OF HAZE IN THE SPECTRAL REGION FROM 0.37 TO 1.0 MICRONS.
APTIC-24805 05

HEALING
HEALING IN RAT LUNG AFTER SUBACUTE EXPOSURE TO NITROGEN DIOXIDE.
APTIC-25759 07

HEALTH IMPAIRMENT
INTRODUCTION AND SUMMARY.
APTIC-25840 07

POSSIBLE LONG TERM EFFECTS OF EXPOSURE TO SULPHUR DIOXIDE.
APTIC-25846 07

EXPERT COMMITTEE REPORT ON THE STANDARDS FOR ENVIRONMENTAL POLLUTION DUE TO CARBON MONOXIDE.
APTIC-26170 07

HEALTH EFFECTS OF PHOTOCHEMICAL OXIDANTS.
APTIC-26223 07

THE HEALTH COSTS OF AIR POLLUTION.
APTIC-26285 07

ACTUAL REPORT OF INFLUENCE OF AIR POLLUTION ON THE BODIES.
APTIC-26306 07

HEARINGS
CONSIDERATIONS ON IMPROVING THE ENVIRONMENTAL PROTECTION.
APTIC-26061 12

HEAT TRANSFER
HEAT TRANSFER AND OTHER EFFECTS OF AN ELECTRIC FIELD ON A PARALLEL FLOW HYDROCARBON DIFFUSION FLAME.
APTIC-24800 06

METHOD AND APPARATUS FOR MINIMIZING AIR POLLUTION.
APTIC-25602 02

CONTINUOUSLY WORKING PLANT FOR THE SEPARATION OF NEON-HELIUM MIXTURES.
APTIC-25809 02

HEATING PLANTS
THE THREAT POSED BY DUST AND INDUSTRIAL GASES EMITTED BY CENTRAL HEATING PLANTS AND OTHER AIR POLLUTION SOURCES.
APTIC-22246 07

HEMATOLOGY
THE EFFECT OF HEAT TREATMENT ON THE STRUCTURE OF KAOLIN AND ITS IN VITRO HEMOLYTIC ACTIVITY.
APTIC-25891 07

THE PUBLIC HEALTH SIGNIFICANCE OF ATMOSPHERIC LEAD.
APTIC-25991 07

HEMOPOIESIS
THE PATHODYNAMICS OF HEMOPOIESIS SUPPRESSION BY NITROUS OXIDE.
APTIC-25667 08

HEXANES
AIR BLOWING.
APTIC-24723 01

SPECTROCOLORIMETRIC DETERMINATION OF HEXACHLOROCYCLOHEXANE IN THE ATMOSPHERE.
APTIC-24575 03

HIGHWAY TRUST FUND (HTF)
AUTOMOTIVE POLLUTION CONTROL.
APTIC-23390 12

HIGHWAYS
THE CURRENT LEAD CONTENT IN VEGETATION GROWING IN THE VICINITY OF SWISS HIGHWAYS.
APTIC-25878 08

RESEARCH ON THE ACTUAL CONDITION OF AIR POLLUTION. 4. INVESTIGATION OF AIR POLLUTION CAUSED BY AUTOMOBILE WASTE GASES IN THE SEISHO NATIONAL HIGHWAY.
APTIC-26207 04

HOSPITALS
HOSPITAL INFECTION.
APTIC-25890 01

HUMANS
THE METABOLISM OF LEAD IN MAN IN HEALTH AND DISEASE. PART II. THE METABOLISM OF LEAD UNDER ABNORMAL CONDITIONS.
APTIC-24614 07

HUMAN COSTS OF POLLUTED AIR.
APTIC-25561 07

HUMIDITY
INVESTIGATION OF THE RELATION BETWEEN THE HUMIDITY OF RESIDENCES AND CHRONIC ATTACKS OF THE BRONCHI OF MINERS.
APTIC-24772 07

AIR HUMIDITY AND BRUSH CONTACT DROP THE EFFECT OF WATER VAPOR, SULFUR DIOXIDE, AND HYDROGEN SULFIDE.
APTIC-24943 09

METHOD AND APPARATUS FOR DETERMINING THE PRESENCE OF VAPOR IN A GAS.
APTIC-25912 03

HYDRIDES
METAL HYDRIDES AS A SOURCE OF FUEL FOR VEHICULAR PROPULSION.
APTIC-24746 02

HYDROCARBONS
EXHAUST BACK PRESSURE CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE.
APTIC-23821 02

TEMPERATURE AS A FACTOR IN DETERMINING ORDER OF ELUTION IN GAS-LIQUID CHROMATOGRAPHY OF SOME C5-C8 HYDROCARBONS.
APTIC-24507 03

SAFETY IN AIR SEPARATION PLANTS DETERMINATION OF ATMOSPHERIC POLLUTANTS BY GAS CHROMATOGRAPHY.
APTIC-24592 03

TURNAROUNDS, EQUIPMENT MAINTENANCE, AND BLOWDOWN SYSTEMS.
APTIC-24602 01

HYDROCARBON REACTIVITIES IN THE ATMOSPHERIC PHOTOOXIDATION OF NITRIC OXIDE.
APTIC-24660 05

AN INVENTORY OF AUTOMOBILE GASES.
APTIC-24700 01

BLIND CHANGING.
APTIC-24721 01

THE DISAPPEARANCE OF ETHYLENE, PROPYLENE, N-BUTANE, AND 1-BUTANE IN SPARK-IGNITION ENGINE EXHAUST.
APTIC-24748 01

HEAT TRANSFER AND OTHER EFFECTS OF AN ELECTRIC FIELD ON A PARALLEL FLOW HYDROCARBON DIFFUSION FLAME.
APTIC-24800 06

PRACTICAL GAS TREATING. PART 4. HYDROCARBON/EG RATIO IS KEY TO SEPARATION OF EMULSION.
APTIC-24870 02

AEROSOL FORMATION FROM GASEOUS AIR POLLUTANTS.
APTIC-24921 05

INHIBITION OF ATMOSPHERIC PHOTOOXIDATION OF HYDROCARBONS BY NITRIC OXIDE.
APTIC-24986 05

APPARATUS FOR REDUCING HYDROCARBON CONTENT OF ENGINE EXHAUST GASES DURING DECELERATION OF AUTOMOBILE.
APTIC-25540 02

VOLATILE TOXIC COMPOUNDS.
APTIC-25598 03

ADSORPTION OF HYDROCARBONS ON GRAPHITIZED CARBON.
APTIC-25621 02

TOXICOLOGICAL STUDIES ON HYDROCARBONS. IX. THE ASPIRATION HAZARD AND TOXICITY OF HYDROCARBONS AND HYDROCARBON MIXTURES.
APTIC-25640 07

GAS TESTING PROCESS FOR SMOG FORMING CONSTITUTENTS.
APTIC-25734 03

CONTINUOUS MEASUREMENT OF LOW GRADE HYDROCARBONS IN URBAN ATMOSPHERE.
APTIC-26109 03

SATURATED HYDROCARBONS IN SKIN SURFACE LIPIDS.
APTIC-26221 07

POWER AND INDUSTRY HYDROCARBONS AND OTHER ORGANIC SPECIES.
APTIC-26231 02

THE TOXICOLOGICAL BASIS OF THRESHOLD LIMIT VALUES 5. THE EXPERIMENTAL INHALATION OF VAPOR MIXTURES BY RATS, WITH NOTES UPON THE RELATIONSHIP BETWEEN SINGLE DOSE INHALATION AND SINGLE DOSE ORAL DATA.
APTIC-26278 07

FORECASTING COH LEVELS AT SIX OUTLYING SAMPLING STATIONS IN ALLEGHENY COUNTY USING STATISTICAL CORRELATIONS DERIVED FROM THE DOWNTOWN STATION.
APTIC-26280 05

HYDROCHLORIC ACID
EMISSION OF HYDROGEN CHLORIDE DURING REFUSE INCINERATION.
APTIC-25062 01

HYDROCYANIC ACID
CHANGES IN ROTATIONAL CONSTANTS IN SOME PI-SIGMA BANDS OF HCN AND N2O.
APTIC-25673 06

HYDRODESULFURIZATION
NEW WAY TO DESULFURIZE RESIDS.
APTIC-24830 02

HYDRODESULFURIZATION OF HEAVY PETROLEUM DISTILLATES.
APTIC-25713 02

CATALYTIC HYDRODESULFURIZATION OF HEAVY FUEL OILS.
APTIC-25797 02

PILOT-PLANT INVESTIGATIONS OF THE DESULPHURISATION OF LIGHT DISTILLATES.
APTIC-25962 02

CHEMICAL STRUCTURES AND ACTIVITIES OF THE HYDRODESULFURIZATION CATALYSTS.
APTIC-26010 02

DESULFURIZATION PROCESS IN WHOLE INDUSTRIES (II).
APTIC-26124 02

THE DISTRIBUTION OF CARBON, VANADIUM AND NICKEL DEPOSITS ON CATALYST LAYER DURING HYDRODESULFURIZATION PROCESSES OF PETROLEUM RESIDUM.
APTIC-26129 02

HYDRODYNAMIC DUST SEPARATORS
GAS SCRUBBING IN THE HYDRODYNAMIC DUST SEPARATOR DURING ELECTROLYSIS OF ALUMINUM.
APTIC-26279 02

HYDROFLUORIC ACID
AN AUTOMATIC HYDROGEN FLUORIDE RECORDER PROPOSED FOR INDUSTRIAL HYGIENE AND STACK MONITORING.
APTIC-25647 03

DAMAGE CAUSED DUE TO FOUNDRY SMOKE.
APTIC-25750 08

ON HYDROGEN FLUORIDE AIR POLLUTION MONITORING DEVICE.
APTIC-26121 03

NEW PENNSALT HF PLANT.
APTIC-26244 02

HYDROGEN SULFIDE
PROCESSES FOR RECOVERING SULFUR FROM SECONDARY SOURCE MATERIALS.
APTIC-22809 02

ATMOSPHERIC CORROSION OF TALLIUM.
APTIC-24619 09

HYDROGEN SULFIDE FROM SULFUR DIOXIDE AND METHANE.
APTIC-24739 06

PROCESS FOR THE CONVERSION OF HYDROGEN SULFIDE WITH SULFUR DIOXIDE TO ELEMENTARY SULFUR.
APTIC-24751 02

A METHOD OF OXIDIZING HYDROGEN SULFIDE TO ELEMENTARY SULFUR.
APTIC-24752 02

THE PRODUCTION OF NUCLEI BY PHOTOCHEMICAL DECOMPOSITIONS OF HYDROGEN SULFIDE.
APTIC-24779 05

IMPROVED PROCEDURE FOR MANUFACTURING SULFUR.
APTIC-24786 02

RECOVERY OF REFINERY SULFUR IN AIR-POLLUTION CONTROL.
APTIC-24792 02

ADSORPTION DESULFURIZATION METHOD FOR GASEOUS SUBSTANCES CONTAINING HYDROGEN SULFIDE.
APTIC-24818 02

METHOD FOR CONVERTING HYDROGEN SULFIDE TO OBTAIN SULFUR.
APTIC-24908 02

AIR HUMIDITY AND BRUSH CONTACT DROP THE EFFECT OF WATER VAPOR, SULFUR DIOXIDE, AND HYDROGEN SULFIDE.
APTIC-24943 09

ZINC ACETATE CYLINDER METHOD (INTEGRAL) FOR HYDROGEN SULFIDE IN THE AIR AS AIR POLLUTANT.
APTIC-25572 03

ODOR CONTROL WITH CHLORINE CUTS COST.
APTIC-25623 02

CARBON DISULFIDE--HYDROGEN SULFIDE BALANCE IN THE PRODUCTION OF VISCOSE TEXTILE FIBERS.
APTIC-25791 02

RECOVERING ELEMENTAL SULFUR FROM WATERS CONTAINING HYDROGEN SULFIDE.
APTIC-25884 02

TRENDS IN THE UTILIZATION OF THE MOST IMPORTANT FORMS OF SULFUR-CONTAINING RAW MATERIAL.
APTIC-25938 02

ON THE INVESTIGATION OF PUBLIC NUISANCE IN AJINANO AREA, TAKEFU CITY.
APTIC-26028 04

METHOD FOR THE DESULFURIZATION OF GASES CONTAINING HYDROGEN SULFIDE OR SULFUR DIOXIDE AND FOR THE PREPARATION OF CRYSTALLINE SULFUR.
APTIC-26163 02

HYDROGENATION
CATALYTIC HYDROGENATION OF SULFUR DIOXIDE.
APTIC-25789 02

HYDROLYSIS
ESTIMATION OF SMALL AMOUNTS OF FLUORIDE IN BODY FLUIDS.
APTIC-24720 07

HYDROSPHERE

BIOGEOCHEMICAL IMPLICATIONS OF LEAD IN THE HYDROSPHERE.
APTIC-26224 08

HYDROXIDES
SIMULTANEOUS RECOVERY OF LOW-CONCENTRATION SULFUR OXIDES AND NITROGEN OXIDES WITH ALKALIES AND CARBONATES. IV. ABSORPTION WITH MAGNESIUM HYDROXIDE.
APTIC-24704 06

REACTIVITY OF FERRIC OXYHYDROXIDE TO SULFUR DIOXIDE.
APTIC-26126 02

IMMUNOLOGY
THE EFFECT OF PLANTS OF A COMBINATION OF SUBACUTE AND TOXIC SULFUR DIOXIDE DOSES.
APTIC-25662 08

THE EFFECT OF OZONE IN THE ANTI-BACTERIAL DEFENSE MECHANISMS OF THE MURINE LUNG.
APTIC-26249 07

IMPINGERS
THE ABSOLUTE EFFICIENCY OF THE IMPINGER AND OF THE ELECTROSTATIC PRECIPITATOR IN THE SAMPLING OF AIR CONTAINING METALLIC LEAD FUME.
APTIC-26145 03

INCINERATION
FLAME GRID AND COMPONENT PARTS THEREOF.
APTIC-23819 02

BURNER MEANS FOR ELIMINATING SMOKE.
APTIC-25570 02

STUDIES ON THE ANALYSIS OF HYDROCARBONS FROM INCINERATOR EFFLUENTS WITH A COMBUSTIBLE GAS INDICATOR.
APTIC-25696 03

ANTIPOLLUTION APPARATUS.
APTIC-25706 02

EMISSION OF HYDROGEN CHLORIDE DURING REFUSE INCINERATION.
APTIC-25862 01

PROPAGATION VELOCITY AND FLAME SPREAD THROUGH SIMULATED FUEL BEDS.
APTIC-25989 06

A CENTRALIZED INCINERATION FACILITY FOR INDUSTRIAL WASTE DISPOSAL.
APTIC-26204 02

INDUSTRIAL AREAS
CURRENT CONDITIONS AND SCIENTIFIC PROBLEMS IN STUDYING THE INJURIOUS EFFECTS OF INDUSTRIAL POLLUTANTS ON PLANTS AND IN DEVELOPING METHODS FOR CONTROLLING THEM IN THE URALS.
APTIC-24867 08

BENZPYRENE CONTENT OF DUST SAMPLES COLLECTED ON URBAN AND RURAL SETTLEMENTS AND IN INDUSTRIAL PLANTS 3,4.
APTIC-25565 04

STUDIES ON RESPIRATORY TRACT DISEASES CAUSED BY AIR POLLUTION --SURVEY OF PUBLIC NUISANCES GRANT BY THE HEALTH AND WELFARE MINISTRY, IN 1967.
APTIC-26053 07

PREVALENCE OF RESPIRATORY SYMPTOMS AND PEAK FLOW RATE OF THREE YEAR OLD CHILDREN.
APTIC-26089 07

INDUSTRIAL EMISSION SOURCES
SYSTEMS STUDY OF NITROGEN OXIDE CONTROL METHODS FOR STATIONARY SOURCES.
APTIC-12619 02

AIR POLLUTION PROBLEMS IN THE UNITED STATES.
APTIC-24039 01

AIR POLLUTION.
APTIC-24759 14

INDUSTRIAL AIR POLLUTION--ITS CONTROL AND COST.
APTIC-24881 02

APTIC-24881 02

INDUSTRY-THE VIEWS OF THE REGULATED.
APTIC-24949 12

NEW DUST REMOVAL METHODS IN THE TOBACCO INDUSTRY.
APTIC-25588 02

THE WORK OF AN OCCUPATIONAL HYGIENE SERVICE IN ENVIRONMENTAL CONTROL.
APTIC-25767 07

CONTROL OF SPECIAL INDUSTRIAL EMISSIONS IN BRITAIN.
APTIC-25879 12

TRENDS IN THE UTILIZATION OF THE MOST IMPORTANT FORMS OF SULFUR-CONTAINING RAW MATERIAL.
APTIC-25938 02

MISCELLANEOUS INDUSTRIAL EMISSIONS.
APTIC-26254 01

INERTIAL SEPARATION
MOBILE DUST AND DEBRIS COLLECTION AND INERTIAL DUST SEPARATOR FOR AIRPORT RUNWAYS AND/OR STREET CLEANING.
APTIC-25709 02

ON THE SEPARATION OF AIRBORNE MATTER BY INERTIA EFFECT IN THE SUBMICRONIC RANGE.
APTIC-25771 03

INFANTS
STUDIES ON THE RELATIONSHIP BETWEEN AIR POLLUTION AND INFANTILE ASTHMA ATTACKS. USING THE SO2 CONCENTRATION IN THE AIR AS AN INDICATOR.
APTIC-26051 07

PERMANENT DAMAGE TO THE NERVOUS SYSTEM CAUSED BY CARBON MONOXIDE POISONING OF A FETUS.
APTIC-26160 07

REPORT ON THE EPIDEMIOLOGICAL INVESTIGATION OF THE HEALTH EFFECTS OF AIR POLLUTION AND REPORT ON THE INVESTIGATION OF INFANT DEATHS IN THE YOKKAICHI DISTRICT.
APTIC-26169 07

INFRARED SPECTROMETRY
THE DETERMINATION OF CHRYSOTILE IN AIRBORNE ASBESTOS.
APTIC-25656 03

CHANGES IN ROTATIONAL CONSTANTS IN SOME PI-SIGMA BANDS OF HCN AND H2O.
APTIC-25673 06

INVESTIGATION OF THE ABSORPTION OF INFRARED RADIATION BY ATMOSPHERIC GASES.
APTIC-25853 06

A METHOD FOR THE ESTIMATION OF SULPHUR TRIOXIDE.
APTIC-25940 03

INGESTION
THE EFFECT OF FLUORINE ON DAIRY CATTLE. V. FLUORINE IN THE URINE AS AN ESTIMATOR OF FLUORINE INTAKE.
APTIC-25735 08

THE TOXICOLOGICAL BASIS OF THRESHOLD LIMIT VALUES 5. THE EXPERIMENTAL INHALATION OF VAPOR MIXTURES BY RATS, WITH NOTES UPON THE RELATIONSHIP BETWEEN SINGLE DOSE INHALATION AND SINGLE DOSE ORAL DATA.
APTIC-26270 07

CONTAMINATION OF DAIRY FEEDS BY AIR POLLUTION.
APTIC-26276 08

INHALATION THERAPY
TOXICITY OF OZONE. IV. SILICONE AEROSOLS AND ALCOHOL VAPOR THERAPY IN OZONE POISONING.
APTIC-26217 07

INHIBITION
ESTIMATION OF SMALL AMOUNTS OF FLUORIDE IN BODY FLUIDS.
APTIC-24720 07

INHIBITION OF ATMOSPHERIC PHOTOOXIDATION OF HYDROCARBONS BY NITRIC OXIDE.
APTIC-24946 05

THE PATHODYNAMICS OF HEMOPOIESIS SUPPRESSION BY NITROUS OXIDE.
APTIC-25667 08

INHIBITION OF CARCINOGENESIS.
APTIC-25845 07

INORGANIC ACIDS
ANALYTICAL METHODS USED TO DETERMINE DAMAGE BY ACIDS IN THE ATMOSPHERE.
APTIC-24970 03

INSPECTION
MAINTENANCE AND MANAGEMENT OF AIR-CLEANING DEVICES IN FACTORIES.
APTIC-25909 02

INSTRUMENTATION
INSTRUMENTATION AND ANALYTICAL TECHNIQUES FOR THE CONTINUOUS DETERMINATION OF AIR CONTAMINANTS.
APTIC-24927 03

INSTRUMENTATION IN POLLUTION CONTROL.
APTIC-25990 03

ANALYTICAL INSTRUMENTATION FOR MONITORING AIR AND WATER POLLUTION.
APTIC-26189 03

POLLUTANT MEASUREMENT AND MONITORING INSTRUMENTATION TASK FORCE ASSESSMENT.
APTIC-26275 03

INSULATORS
EXAMINATION OF THE BEHAVIOR OF HIGH VOLTAGE INSULATORS UNDER POLLUTION CONDITIONS, USING A CONVENTIONAL TESTING METHOD, WITH PARTICULAR REFERENCE TO THE SELF-CLEANING APTITUDE.
APTIC-25926 11

RESULTS OF FIVE YEARS EXPERIENCE WITH THE BEHAVIOR OF INSULATORS FOR MEDIUM VOLTAGE UNDER CONDITIONS OF NATURAL INDUSTRIAL POLLUTION.
APTIC-26241 09

INTERMITTENT MONITORING
ATMOSPHERE SAMPLING DEVICE.
APTIC-25712 03

SOPHISTICATED SYSTEMS REQUIRED TO MONITOR HEAVIER POLLUTION.

APTIC-26256   03

INTERNAL COMBUSTION ENGINES
EMISSION AND PERFORMANCE OF GASOLINE ENGINE.
APTIC-24813   01

WATER INJECTOR FOR ENGINE EXHAUST.
APTIC-25557   02

IMPROVEMENTS IN OR RELATING TO DEVICES FOR CLEANING EXHAUST GASES.
APTIC-25599   02

AFTERBURNER FOR AN INTERNAL COMBUSTION ENGINE.
APTIC-25728   02

AN EXPERIMENT STUDY ON EXHAUST GASES OF KEROSENE WITH VEHICLE ENGINE.
APTIC-25754   01

AIR POLLUTION FROM MOTOR VEHICLES.
APTIC-25886   02

COMBUSTION CHAMBER INVESTIGATIONS BY MEANS OF MICROWAVE RESONANCES.
APTIC-26268   03

INTERSTATE EFFECTS SURVEILLANCE NETWORK
INTERSTATE EFFECTS SURVEILLANCE NETWORK. 1969 DATA.
APTIC-22703   04

INVERSION
PENETRATION OF AN INVERSION LAYER BY AN INDUSTRIAL CUMULUS.
APTIC-24583   05

ATMOSPHERIC STRATIFICATION CHARACTERISTICS IN INVERSIONS.
APTIC-25633   05

AIR POLLUTION LEVELS ASSOCIATED WITH A 49-HR INVERSION AT DETROIT-WINDSOR.
APTIC-25784   04

CONCERNING INDIRECT DETERMINATION OF THE REPEATABILITY OF LARGE-SCALE NEAR-GROUND INVERSIONS IN CITIES OF SIBERIA.
APTIC-25811   05

AREA METEOROLOGY.
APTIC-25855   05

IODINATED HYDROCARBONS
KINETIC EVIDENCE CONCERNING THE GEOMETRY OF SUBSTITUTED METHYL RADICALS.
APTIC-25985   06

IODINE COMPOUNDS
ICE NUCLEI FROM DIRECT REACTION OF IODINE VAPOR WITH VAPORS FROM LEADED GASOLINE.
APTIC-26191   01

IONIZATION
IMPROVEMENTS IN OR RELATING TO DEVICES FOR CLEANING EXHAUST GASES.
APTIC-25599   02

IONIZATION CHAMBERS
SIMULATION OF PHOTOCHEMICAL REACTION IN POLLUTED AIR.
APTIC-25887   05

IONS
CONDUCTION AND PUMPING IN DIELECTRIC LIQUIDS UNDER THE INFLUENCE OF AN APPLIED ELECTRIC FIELD.
APTIC-25684   06

CONTRIBUTION TO THE THEORY OF ELECTRICAL CHARGING OF AN AEROSOL.
APTIC-25980   06

THE IONS OF THE TROPOSPHERE   THEIR INTERACTIONS WITH AEROSOLS AND THE GEOELECTRIC FIELD.
APTIC-26080   05

HUMAN BEHAVIOR AND ATMOSPHERIC IONS.
APTIC-26149   07

IPC-1478 FILTER PAPER
EFFICIENCY OF IPC-1478 FILTER PAPER AGAINST POLYSTYRENE LATEX AND DIOCTYL PHTHALATE AEROSOLS.
APTIC-22190   03

IRON
SULFUR IN IRON- AND STEELMAKING.
APTIC-24928   01

CORROSION BEHAVIOR OF CAST IRON IN RURAL, MARINE AND INDUSTRIAL ATMOSPHERES AND IN SEA WATER.
APTIC-25544   09

CORROSION PRODUCTS IN VARIOUS ENVIRONMENTS.
APTIC-25727   09

BRONCHIAL CANCER IN THE IRON MINER OF THE LORRAINE BASIN. (BASED ON 225 OBSERVATIONS).
APTIC-26001   07

TREATMENT OF DUST GENERATED AT IRON MILL.
APTIC-26003   02

IRON COMPOUNDS
FERRIC SULPHATE AND SULPHURIC ACID FROM SULPHUR DIOXIDE AND AIR.
APTIC-26142   02

IRON OXIDES
SELECTION OF GAS CLEANING EQUIPMENT FOR AN ORE PREPARATION PLANT.
APTIC-24676   02

REACTIVITY OF FERRIC OXYHYDROXIDE TO SULFUR DIOXIDE.
APTIC-26126   02

IRRADIATION CHAMBERS
DESIGN OF A FACILITY (SMOG CHAMBER) FOR STUDYING PHOTOCHEMICAL REACTIONS UNDER SIMULATED TROPOSPHERIC CONDITIONS.
APTIC-24659   03

ISOBUTANES
TERMINAL PROGRESS REPORT ON PUBLIC HEALTH SERVICE RESEARCH GRANT AP00349, 1/1/64 TO 12/31/68.
APTIC-25636   06

ISOTOPES
SURFACE COLLECTION EFFICIENCY OF LARGE-PORE MEMBRANE FILTERS.
APTIC-22169   03

STABLE ISOTOPES APPLIED TO POLLUTION STUDIES.
APTIC-26123   03

BIOGEOCHEMICAL IMPLICATIONS OF LEAD IN THE HYDROSPHERE.
APTIC-26224   08

JAPAN
ON DEVELOPMENT OF DESULFURIZATION TECHNOLOGY   ONE OF MITI'S BIG PROJECTS.
APTIC-26005   02

JET AIRCRAFT
MEASURING GASEOUS EMISSIONS FROM AN AIRCRAFT TURBINE ENGINE.
APTIC-24745   03

REDUCING JET POLLUTION BEFORE IT BECOMES SERIOUS.
APTIC-26181   02

JET IMPACTORS
OBSERVATIONS ON THE THEORY OF JET IMPACTORS.
APTIC-12836   03

KANAGAWA PREFECTURE
RESEARCH ON THE ACTUAL CONDITION OF AIR POLLUTION. 3. DEGREE OF AIR POLLUTION IN KANAGAWA PREFECTURE. (MEASURED BY ALKALINE PAPER FILTRATION METHODS).
APTIC-26030   04

DEGREE OF AIR POLLUTION IN KANAGAWA PREFECTURE.
APTIC-26052   04

KANAWHA VALLEY
KANAWHA VALLEY AIR POLLUTION STUDY.
APTIC-25996   04

KAWASAKI
AIR POLLUTION IN KAWASAKI.
APTIC-24789   04

THE INVESTIGATION OF THE ACTUAL CONDITION OF AIR POLLUTION. 1.1 AIR POLLUTION IN THE KEIHIN INDUSTRIAL DISTRICTS.
APTIC-26044   04

KERGUELEN ISLANDS
ATMOSPHERIC OZONE CONCENTRATION AT GROUND LEVEL, PORT AUX FRANCAIS STATION (KERGUELEN ISLANDS).
APTIC-26151   04

KEROSENE
AN EXPERIMENT STUDY ON EXHAUST GASES OF KEROSENE WITH VEHICLE ENGINE.
APTIC-25754   01

KILNS
ACID SMUT EMISSION PROBLEMS STUDIED.
APTIC-26118   02

KRAFT PULPING
SULPHUR COMPOUNDS IN KRAFT PULP MILL EFFLUENTS.
APTIC-24902   01

MODERN METHODS OF MONITORING GASEOUS PULP MILL EFFLUENTS FOR SULFUR COMPOUNDS.
APTIC-24939   03

AIR POLLUTION PROBLEMS IN THE WOOD PRODUCTS INDUSTRY.
APTIC-25683   01

METHOD AND APPARATUS FOR RECYCLING DRYER STACK GASES.
APTIC-25863   02

ELIMINATION OF ODORS IN A SULPHATE PULP MILL.
APTIC-26176   02

KYOTO
A TENTATIVE PLAN CONCERNING A COMPREHENSIVE ASSESSMENT OF ENVIRONMENTAL POLLUTION.
APTIC-26304   04

L RADIATIONS
IMPROVEMENT OF X-RAY SPECTROGRAPHIC ANALYSIS OF FILTRATION OF THE L LINES FROM THE PRIMARY BEAM.
APTIC-25822   03

LABORATORY ANIMALS
EFFECTS OF AIR POLLUTION ON ANIMALS EXPOSED TO STREET

ATMOSPHERES IN DETROIT.
APTIC-24964 07

SOME OBSERVATIONS ON ANIMALS EXPOSED TO AIR POLLUTANTS
ESPECIALLY SULPHUR OXIDES.
APTIC-26116 07

LASERS
SENSING OF METEOROLOGICAL VARIABLES BY LASER PROBE
TECHNIQUES. (FINAL REPORT).
APTIC-25796 05

A SCATTERED LIGHT PARTICLE-SIZE SPECTROMETER FOR
SUBMICROSCOPIC AEROSOLS OF HIGH CONCENTRATION.
APTIC-25871 03

DEVELOPMENT OF A LASER SYSTEM FOR ABSOLUTE ATMOSPHERIC
DIFFUSION MEASUREMENT OF A GASEOUS TRACER MATERIAL. (FINAL
REPORT).
APTIC-25936 03

PARTICLE-SIZE SPECTROMETRY OF AEROSOLS BY LIGHT SCATTERING
IN A LASER BEAM AND ITS APPLICATION TO AIR MONITORING AND
FILTER TESTING.
APTIC-26214 03

LAUNDERING (COAL)
COAL CLEANING PLANT PROTOTYPE SPECIFICATIONS A REPORT TO
PROCESS CONTROL ENGINEERING DIVISION NATIONAL AIR POLLUTION
CONTROL ADMINISTRATION.
APTIC-25820 02

LEAD
THE METABOLISM OF LEAD IN MAN IN HEALTH AND DISEASE. PART
II. THE METABOLISM OF LEAD UNDER ABNORMAL CONDITIONS.
APTIC-24614 07

TECHNOLOGY OF POLLUTION-CONTROL IN ZINC AND LEAD SMELTING.
APTIC-26107 01

LEAD COMPOUNDS
LEAD IN EXHAUST GASES.
APTIC-24757 04

STUDIES ON HUMAN AND EXPERIMENTAL LEAD POISONING. THE
INHIBITORY MECHANISM OF RED BLOOD CELL ALA-DEHYDRATASE.
APTIC-24784 07

POLLUTION OF CULTIVATED PLANTS WITH LEAD FROM AUTO EXHAUST.
APTIC-24788 08

LEADED OR NON-LEADED GASOLINE...WHAT ARE THE FACTS
APTIC-24829 02

THE HYGIENIC ASPECTS OF THE PRODUCTION AND USE OF LEAD
ANTIKNOCK COMPOUNDS.
APTIC-24876 07

LEAD AND AIR POLLUTION AN ANALYSIS OF THE MORSE REPORT.
APTIC-24877 01

AIR AS A SOURCE OF LEAD IN EDIBLE CROPS.
APTIC-24947 08

LEAD IN A SUBURBAN ENVIRONMENT.
APTIC-24952 04

MOTOR FUMES AND ATMOSPHERIC POLLUTION.
APTIC-24961 07

THE EFFECTS OF LEAD ADDITIVES ON REACTIONS IN EXHAUST
SYSTEMS.
APTIC-25581 01

AIR POLLUTION FROM SOLDERING FUMES.
APTIC-25624 07

LEADED PARTICLES IN URBAN AREAS.
APTIC-25635 04

FIELD METHOD FOR THE DETERMINATION OF INORGANIC LEAD FUMES
IN AIR.
APTIC-25691 03

A FILTER PAPER METHOD FOR LEAD FUME COLLECTION.
APTIC-25793 03

THE CURRENT LEAD CONTENT IN VEGETATION GROWING IN THE
VICINITY OF SWISS HIGHWAYS.
APTIC-25878 08

HORIZONTAL AND VERTICAL DISTRIBUTION OF LEAD PARTICULATES IN
AIR AROUND A BUSY ROAD IN YOKOHAMA CITY.
APTIC-25881 04

A PRACTICAL METHOD FOR THE RAPID DETERMINATION OF LEAD WHEN
FOUND IN THE ATMOSPHERE.
APTIC-25932 03

OCCURRENCE OF AIRBORNE LEAD IN SAN FRANCISCO BAY AND ITS
RELATION TO ANIMAL DISEASE.
APTIC-25967 08

USE OF ELECTROLYSIS TO DETERMINE TRACE AMOUNTS OF LEAD,
COPPER, AND ZINC IN STUDIES OF THE ATMOSPHERE.
APTIC-25979 03

THE PUBLIC HEALTH SIGNIFICANCE OF ATMOSPHERIC LEAD.
APTIC-25991 07

REMOVAL OF LEAD FROM AUTOMOBILE EXHAUSTS BY MOLTEN SALTS.
APTIC-26064 02

THE ABSOLUTE EFFICIENCY OF THE IMPINGER AND OF THE
ELECTROSTATIC PRECIPITATOR IN THE SAMPLING OF AIR CONTAINING
METALLIC LEAD FUME.
APTIC-26145 03

A FOLLOW-UP STUDY OF LEAD WORKERS.
APTIC-26177 07

PROJECT REPORT LEAD.
APTIC-26215 07

LEAD IN THE ENVIRONMENT AND ITS EFFECT ON MAN IN JAPAN.
APTIC-26260 07

AN INTERIM REPORT ON THE INVESTIGATION OF PUBLIC NUISANCE BY
LEAD.
APTIC-26310 04

LEATHER
IMPROVEMENTS IN MACHINERY USED TO DRESS HIDES, SKINS, AND
SIMILAR MATERIALS.
APTIC-25684 06

LEAVES
A PARTIAL POLLUTION SOLUTION PLANT TREES.
APTIC-24622 02

THE MICRODETERMINATION OF FLUORIDE IN VEGETATION.
APTIC-24966 03

THE INFLUENCE OF AIR POLLUTION. 3.1. THE INFLUENCE OF AIR
POLLUTION ON TREES. 2. THE CHARACTERISTICS OF INSOLUBLE
SUBSTANCES ADHERED TO THE LEAVES OF ROADSIDE TREES.
APTIC-26035 08

EFFECT OF AIR POLLUTION ON TREES. 3. ANALYSIS AND
FRACTIONATION OF SULFUR IN THE LEAVES OF STREET TREES.
APTIC-26078 08

LEGAL ASPECTS
PROBING THE LAW AND BEYOND A QUEST FOR PUBLIC PROTECTION
FROM HAZARDOUS PRODUCT CATASTROPHES.
APTIC-24760 12

LEGISLATION
BOILERS AND THE CLEAN AIR ACTS.
APTIC-24828 12

A SUMMARY OF FEDERAL, STATE AND LOCAL AIR POLLUTION LAWS.
APTIC-24855 12

A GUIDE TO THE AIR QUALITY ACT OF 1967.
APTIC-24930 12

AIR POLLUTION ABATEMENT PROCEDURES UNDER THE CLEAN AIR ACT.
APTIC-24948 12

SUMMARY OF THE AIR QUALITY ACT OF 1967.
APTIC-24950 12

THE LEGAL BASIS OF AIR POLLUTION CONTROL.
APTIC-25555 12

THE ROLE OF PRIVATE NUISANCE LAW IN THE CONTROL OF AIR
POLLUTION.
APTIC-25596 12

AIR POLLUTION, PRE-EMPTION, LOCAL PROBLEMS AND THE
CONSTITUTION--SOME PIGEONHOLES AND HATRACKS.
APTIC-25671 12

THE GROWTH OF PUBLIC OPINION.
APTIC-25776 13

CONTROL OF SPECIAL INDUSTRIAL EMISSIONS IN BRITAIN.
APTIC-25879 12

CONGRESS MAKES FURTHER PROGRESS ON ANTIPOLLUTION
LEGISLATION.
APTIC-26068 12

EUROPEAN LEGISLATION ON POLLUTION AND WASTE DISPOSAL.
APTIC-26070 12

DEFICIENCIES IN THE AIR QUALITY ACT OF 1967.
APTIC-26196 12

LEGISLATING FOR AIR QUALITY MANAGEMENT REDUCING THEORY TO
PRACTICE.
APTIC-25205 12

LEUKEMIA
STOMACH CANCER AND AIR POLLUTION AN EXPERIMENTAL STUDY IN
A PETROCHEMICAL AREA.
APTIC-26250 07

LEVEL-CROSSING SPECTROSCOPY
MEASUREMENT OF THE LIFETIME OF THE A 1 PI STATE OF CO BY
LEVEL-CROSSING SPECTROSCOPY.
APTIC-24888 06

LICHENS
LICHENS AS AN INDICATOR OF AIR POLLUTION.
APTIC-25655 08

LIDAR
AN INVESTIGATION OF ATMOSPHERIC STRUCTURE IN THE LOWER
TROPOSPHERE BY LIDAR PROBING.
APTIC-24795 05

LIFE SPAN
MEASUREMENT OF THE LIFETIME OF THE A 1 PI STATE OF CO BY LEVEL-CROSSING SPECTROSCOPY.
APTIC-24888 06

LIGHT RADIATION
NEW METHOD OF LIGHT MODULATION FOR DUAL-BEAM PHOTOMETERS AND SPECTROPHOTOMETERS.
APTIC-24897 03

EFFECT OF ATMOSPHERIC CONTAMINANTS ON LIGHTFASTNESS TESTING.
APTIC-24906 09

LIGHT SCATTERING
THE PHYSICS OF LIGHT SCATTERING.
APTIC-24680 05

LIGHT-SCATTERING METHOD OF MEASURING AEROSOL PARTICLES.
APTIC-24974 03

RESPONSE CALCULATIONS FOR SIDEWAYS LIGHT SCATTERING AEROSOL PARTICLE COUNTERS.
APTIC-25721 03

LIMESTONE
FURTHER APPLICATIONS OF THE LIMED FILTER PAPER TECHNIQUE IN FLUORINE AIR POLLUTION STUDIES.
APTIC-25816 03

LIPIDS
INCORPORATION OF ACETATE-1-C14 INTO ALKANES, FATTY ACIDS, METHYL ESTERS AND FREE FATTY ACIDS OF SPORES AND MYCELIUM OF RHIZOPUS ARRHIZUS.
APTIC-12614 06

LIPID COMPONENTS OF SCLEROTIA OF SCLEROTINIA SCLEROTIORUM.
APTIC-12615 06

THE BIOSYNTHESIS OF STERYL GLUCOSIDES IN PLANTS.
APTIC-24661 08

OZONE AND LIPID PEROXIDATION.
APTIC-24953 07

SATURATED HYDROCARBONS IN SKIN SURFACE LIPIDS.
APTIC-26221 07

LIQUIDUS CURVE
LIQUIDUS CURVE OF THE GA-SB-TE SYSTEMS.
APTIC-25675 06

LITIGATION
INDUSTRY-THE VIEWS OF THE REGULATED.
APTIC-24949 12

THE ROLE OF PRIVATE NUISANCE LAW IN THE CONTROL OF AIR POLLUTION.
APTIC-25596 12

THE MISDEMEANOR APPROACH TO POLLUTION CONTROL.
APTIC-25597 12

THE CALAVERAS CEMENT CO. DUST SUIT.
APTIC-25642 12

LOAD SHIFTING
A LOAD SHIFTING MODEL FOR AIR POLLUTION CONTROL IN THE ELECTRIC POWER INDUSTRY.
APTIC-24681 02

LOADING FACILITIES
LOADING FACILITIES.
APTIC-24601 01

LOCAL GOVERNMENTS
AIR POLLUTION AND GOVERNMENT STRUCTURE.
APTIC-25763 12

ADMINISTRATIVE NEEDS AND PATTERNS OF AIR-POLLUTION CONTROL.
APTIC-25774 12

LOFTING
PENETRATION OF AN INVERSION LAYER BY AN INDUSTRIAL CUMULUS.
APTIC-24583 05

LONDON
CARBON MONOXIDE IN TOWN AIR   AN INTERIM REPORT.
APTIC-25799 04

LOS ANGELES
PROGRESS IN SMOG CONTROL AT LOS ANGELES.
APTIC-24744 04

DETERMINATION OF SMALL AMOUNTS OF SULFURIC ACID IN THE ATMOSPHERE.
APTIC-24874 04

THE CONTROL OF ORGANIC SOLVENTS.
APTIC-25592 01

THE MISDEMEANOR APPROACH TO POLLUTION CONTROL.
APTIC-25597 12

COMBATTING THE EFFECTS OF SMOG ON WIRE-SPRING RELAYS.
APTIC-25606 09

ATMOSPHERIC REACTION STUDIES IN THE LOS ANGELES BASIN. VOLUME II. COMMERCE GROUND DATA. 1969. (FINAL REPORT).
APTIC-25856 04

ATMOSPHERIC REACTION STUDIES IN THE LOS ANGELES BASIN. VOLUME III. EL MONTE GROUND DATA. 1969. (FINAL REPORT).
APTIC-25857 04

ATMOSPHERIC REACTION STUDIES IN THE LOS ANGELES BASIN. (FINAL REPORT).
APTIC-25994 04

RESEARCH ON ODOR CONTROL IN THE U.S.A. (A CHAPTER OF RENDERING PLANTS IN WEST COAST).
APTIC-26057 12

SULFUR DIOXIDE, SULFURIC ACID AEROSOL AND VISIBILITY IN LOS ANGELES.
APTIC-26216 04

LOWER ATMOSPHERE
AN INVESTIGATION OF ATMOSPHERIC STRUCTURE IN THE LOWER TROPOSPHERE BY LIDAR PROBING.
APTIC-24795 05

DEPENDENCE BETWEEN THE CONCENTRATION OF AEROSOLS AND THE INTENSITY OF TURBULENT INTERCHANGE IN LOWER ATMOSPHERE.
APTIC-24904 05

BIBLIOGRAPHICAL STUDY OF THE ABSORBENT PROPERTIES OF OZONE IN THE ULTRAVIOLET RANGE.
APTIC-25788 05

ACOUSTIC METHODS FOR THE REMOTE PROBING OF THE LOWER ATMOSPHERE.
APTIC-26150 03

LOW-VOLUME SAMPLERS
LOW VOLUME AIR SAMPLER   RESEARCH ON THE MEASUREMENT OF THE PARTICULATES IN THE AIR WITH LOW VOLUME AIR SAMPLER.
APTIC-26007 03

LUNG CANCER
EXPERIMENTAL CARCINOGENESIS OF THE LUNG. II. INFLUENCE OF PHENOLS IN THE PRODUCTION OF CARCINOMA.
APTIC-24633 07

THE DEATH RATE DUE TO LUNG CANCER IN PEOPLE LIVING IN SELECTED TOWNS IN POLAND IN THE POLLUTION OF THE ATMOSPHERE.
APTIC-24935 07

THE ROLE OF 3 4-BENZPYRENE IN THE EPIDEMIOLOGY OF LUNG CANCER.
APTIC-25613 07

URBAN-RURAL DIFFERENCES IN LUNG CANCER MORTALITY RATES IN THE STATE.
APTIC-25849 07

LUNGS
EXTENSIVE PULMONARY CHANGES IN AN APPARENTLY LIGHT NITROGEN OXIDES POISONING.
APTIC-25747 07

HEALING IN RAT LUNG AFTER SUBACUTE EXPOSURE TO NITROGEN DIOXIDE.
APTIC-25759 07

STUDY OF PULMONARY DUST DEPOSITS WITH ELECTRON MICROSCOPE AND MICROANALYSIS WITH AN ELECTRONIC PROBE.
APTIC-26110 07

EFFECT OF IN VITRO EXPOSURE TO O3 ON SURFACE TENSION OF LUNG EXTRACT.
APTIC-26115 07

ENVIRONMENTAL INFLUENCE ON INTRAUTERINE LUNG DEVELOPMENT.
APTIC-26207 07

THE EFFECT OF OZONE IN THE ANTI-BACTERIAL DEFENSE MECHANISMS OF THE MURINE LUNG.
APTIC-26249 07

MAGNESIUM BISULFITE
SOLUBILITY OF SULPHUR DIOXIDE IN SATURATED MAGNESIUM BISULPHITE SOLUTION   TAPPI DATA SHEET 164   SOLUBILITY OF SULPHUR DIOXIDE IN SATURATED MAGNESIUM BISULPHITE SOLUTION TAPPI DATA SHEET 165   SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 5 C   TAPPI DATA SHEET 166 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 15 C   TAPPI DATA SHEET 167   SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 25 C TAPPI DATA SHEET 168   SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 35 C   TAPPI DATA SHEET 169   SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 50 C   TAPPI DATA SHEET 170   SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 60 C TAPPI DATA SHEET 171.
APTIC-25672 06

MAGNESIUM COMPOUNDS
SIMULTANEOUS RECOVERY OF LOW-CONCENTRATION SULFUR OXIDES AND NITROGEN OXIDES WITH ALKALIES AND CARBONATES. IV. ABSORPTION WITH MAGNESIUM HYDROXIDE.
APTIC-24704 06

MAGNETOHYDRODYNAMICS (MHD)
THE WESTERN COAL DEPOSITS   A NATIONAL SOURCE OF POWER.
APTIC-24955 01

MAINTENANCE
TURNAROUNDS, EQUIPMENT MAINTENANCE, AND BLOWDOWN SYSTEMS.
APTIC-24602 01

THE MAINTENANCE AND PRESERVATION OF THE EFFICIENCY OF AN

ELECTRIC AIR-CLEANING DEVICE.
APTIC-25724 02

THE STUDY OF MAINTENANCE OF AIR-CLEANING DEVICES AS AIR POLLUTION CONTROL MEASURE.
APTIC-25880 02

MAINTENANCE AND MANAGEMENT OF AIR-CLEANING DEVICES IN FACTORIES.
APTIC-25889 02

MAINTENANCE AND MANAGEMENT OF AIR-CLEANING DEVICES IN OFFICE BUILDINGS.
APTIC-25915 02

MANAGEMENT PERSONNEL
POLLUTION CONTROL A CORPORATE DILEMMA.
APTIC-23612 12

MANGANESE COMPOUNDS
FLAME PHOTOMETRIC DETERMINATION OF LEAD AND MANGANESE IN GASOLINE.
APTIC-24719 03

MANGANESE DIOXIDE (JAPANESE)
PROCESSES FOR RECOVERING SULFUR FROM SECONDARY SOURCE MATERIALS.
APTIC-22809 02

A NEW DRY PROCESS OF SO2 REMOVAL FROM FLUE GAS.
APTIC-24589 02

DISPOSAL METHOD OF SULFUR OXIDE (SO2, SO3)-CONTAINING GAS.
APTIC-26105 02

MAPPING
A TENTATIVE PLAN CONCERNING A COMPREHENSIVE ASSESSMENT OF ENVIRONMENTAL POLLUTION.
APTIC-26304 04

MASS SPECTROMETRY
PALLADIUM DEVICES FOR GAS CHROMATOGRAPHY.
APTIC-24665 03

AN IMPROVED CONTAMINANT SENSING TECHNIQUE FOR LABORATORY AND SPACECRAFT APPLICATION.
APTIC-24959 03

STABLE ISOTOPES APPLIED TO POLLUTION STUDIES.
APTIC-26123 03

MASSACHUSETTS
REPORT FOR CONSULTATION ON THE METROPOLITAN PROVIDENCE INTERSTATE AIR QUALITY CONTROL REGION (RHODE ISLAND-MASSACHUSETTS).
APTIC-12569 12

MATERIALS DETERIORATION
REACTION OF SO2 WITH POLYMER.
APTIC-24782 09

THE EFFECT OF AIR POLLUTANTS ON COTTON.
APTIC-24899 09

AIR HUMIDITY AND BRUSH CONTACT DROP THE EFFECT OF WATER VAPOR, SULFUR DIOXIDE, AND HYDROGEN SULFIDE.
APTIC-24983 09

RESULTS OF FIVE YEARS EXPERIENCE WITH THE BEHAVIOR OF INSULATORS FOR MEDIUM VOLTAGE UNDER CONDITIONS OF NATURAL INDUSTRIAL POLLUTION.
APTIC-26241 09

MATHEMATICAL ANALYSES
MASS AND MOMENTUM EQUATIONS OF ISOTHERMAL NON-ISOBARIC GAS-LIQUID PHASE REACTIONS. III.
APTIC-12835 06

VENTILATION OF POLLUTED AIR IN ROOMS. VIII. STUDIES ON THEORETICAL EQUATIONS FOR VENTILATION OF POLLUTED AIR DIFFUSED HETEROGENEOUSLY IN ROOM.
APTIC-24647 06

STABILIZATION OF TURBULENT DIFFUSION FLAMES.
APTIC-24698 06

CONJECTURE ON A CONNECTION BETWEEN LIFT AND PARTICLE DISPLACEMENT.
APTIC-24882 06

NEW METHOD OF LIGHT MODULATION FOR DUAL-BEAM PHOTOMETERS AND SPECTROPHOTOMETERS.
APTIC-24897 03

THE MEASUREMENT OF AIR POLLUTION AND THE ESTABLISHMENT OF CRITERIA FOR THE EVALUATION OF AIR QUALITY.
APTIC-24907 11

THE ROLE OF DIFFUSIVITY IN TURBULENT DISPERSION.
APTIC-24909 06

ATTEMPT TO DEFINE THE EXPOSURE LIMITS OF CONCENTRATION FOR SO2, CL2, H2S, AND THE NITROGEN OXIDES IN AN URBAN ATMOSPHERE.
APTIC-24941 11

THE DEPOSITION OF DUST PARTICLES FROM ELEVATED SOURCES.
APTIC-25648 05

ATMOSPHERIC IMPURITIES AND THE PROBLEM OF OBTAINING EXTRA PURE SUBSTANCES.
APTIC-25676 14

AN ANALYSIS OF THE DRIVING PATTERN IN THE METROPOLITAN AREA. PART II.
APTIC-25725 01

SIMULTANEOUS PHYSICAL SINGULARITY IN SPACE FILLED BY DUST-LIKE MEDIUM.
APTIC-25749 06

TEMPERATURE CHARACTERISTICS OF FIBRE FILTERS.
APTIC-25798 02

AN ASYMPTOTIC METHOD FOR SOLVING EQUATIONS OF BROWNIAN MOTION OF AEROSOL PARTICLES.
APTIC-25807 06

CONCERNING INDIRECT DETERMINATION OF THE REPEATABILITY OF LARGE-SCALE NEAR-GROUND INVERSIONS IN CITIES OF SIBERIA.
APTIC-25811 05

THE THEORETICAL CALCULATION OF THE DISTRIBUTION OF PHOTOCHEMICALLY-FORMED OZONE IN THE ATMOSPHERE.
APTIC-25924 05

USE OF ROUTINE METEOROLOGICAL OBSERVATIONS FOR ESTIMATING ATMOSPHERIC DISPERSION.
APTIC-25935 05

DEFLECTION OF A JET INJECTED INTO A STREAM.
APTIC-25942 05

TECHNIQUES FOR DETERMINING THE TURBIDITY OF THE ATMOSPHERE.
APTIC-25959 03

STUDIES ON REGIONAL REPRESENTATIVE VALUE OF AIR POLLUTANT.
APTIC-26131 04

ANALYTICAL METHODS FOR DETERMINATION OF AEROSOLS BY MEANS OF MEMBRANE ULTRAFILTERS. VII. DIFFUSION AND IMPACTION PRECIPITATION OF AEROSOL PARTICLES BY MEMBRANE ULTRAFILTERS.
APTIC-26266 03

MATHEMATICAL MODELING
ANALYSIS OF SPACE-CHARGE PRECIPITATION.
APTIC-24794 02

DYNAMICS OF A GAS ABSORPTION COLUMN.
APTIC-24798 02

TRANSVERSE JET PLUME. (TECHNICAL PROGRESS REPORT).
APTIC-25831 05

EXPERIMENTAL STUDIES OF INHALED MATERIALS. A BASIS FOR RESPIRATORY MODELS.
APTIC-25883 07

MAXIMUM ALLOWABLE CONCENTRATION
PROPERTIES OF OZONE AS AN INDUSTRIAL POISON.
APTIC-24741 07

THE SHARE OF AUTOMOBILE EXHAUST GASES IN AIR POLLUTION.
APTIC-24783 01

ATTEMPT TO DEFINE THE EXPOSURE LIMITS OF CONCENTRATION FOR SO2, CL2, H2S, AND THE NITROGEN OXIDES IN AN URBAN ATMOSPHERE.
APTIC-24941 11

REVIEW OF TENTATIVE ABORT, ALERT, 100 AND 1000-DAY LIMITS FOR SPACE CABIN CONTAMINANTS.
APTIC-24957 11

AIR POLLUTION PROBLEMS IN THE WOOD PRODUCTS INDUSTRY.
APTIC-25683 01

THE TOXICOLOGICAL BASIS OF THRESHOLD LIMIT VALUES 1. EXPERIENCE WITH THRESHOLD LIMIT VALUES BASED ON ANIMAL DATA.
APTIC-25917 11

DUST AND SOOT NUISANCES AT A METALLURGICAL COKING PLANT AND IN ITS ENVIRONMENT.
APTIC-26040 01

THRESHOLD LIMIT VALUES FOR CARBON MONOXIDE.
APTIC-26103 11

PSYCHOLOGICAL AND BEHAVIORAL EFFECTS.
APTIC-26156 07

EXPERT COMMITTEE REPORT ON THE STANDARDS FOR ENVIRONMENTAL POLLUTION DUE TO CARBON MONOXIDE.
APTIC-26170 07

MEASUREMENT METHODS
AIR POLLUTION INSTRUMENTATION. STATE OF THE ART.
APTIC-12596 03

AIRCRAFT GAS TURBINE ENGINE EXHAUST SMOKE MEASUREMENT.
APTIC-24581 03

AIR POLLUTION CONTROL HEALTH ASPECTS AND MICROTECHNIQUES.
APTIC-24603 03

DETAILED DETERMINATION OF NITROGEN COMPOUNDS CONTAINED IN WASTE GASES.
APTIC-24682 03

AIR POLLUTION MEASUREMENTS. DEVELOPMENTS IN AIR POLLUTION MEASUREMENT.
APTIC-24715 03

DEVELOPMENT AND TESTING, WITH STANDARDISED MIXTURES AND ON A VAPOR GENERATOR, OF AN INSTRUMENT FOR MEASURING SO3 IN COMBUSTION PRODUCTS.
APTIC-24879 03

ATMOSPHERIC OZONE.
APTIC-24929 03

APTIC-24929 03

A METHOD FOR TESTING HIGH EFFICIENCY MECHANICAL FILTERS FOR THE SEPARATION OF RADIOACTIVE AEROSOLS AND FOR PERSONAL PROTECTION.
APTIC-24967 02

LIGHT-SCATTERING METHOD OF MEASURING AEROSOL PARTICLES.
APTIC-24974 03

EFFECT OF AUTOMOBILE EXHAUST ON CELL GROWTH IN VITRO.
APTIC-25604 03

RESPIRATOR FILTER PENETRATION USING SODIUM CHLORIDE AEROSOL.
APTIC-25611 03

TERMINOLOGY AND UNITS OF MEASURE.
APTIC-25629 14

APPARATUS FOR CONTINUOUSLY MEASURING THE CONCENTRATION OF A GAS-MIXTURE COMPONENT.
APTIC-25637 03

STANDARD METHODS OF FILTER TESTING.
APTIC-25674 02

THE USE OF RADIOACTIVE TRACERS IN QUANTITATIVE STUDIES OF MOVEMENTS OF THE ATMOSPHERE.
APTIC-25842 05

THE MEASUREMENT OF EMISSIONS FROM SOLID FUEL HEATING UNIT.
APTIC-25921 03

AIR POLLUTANT ANALYSIS.
APTIC-26106 03

MEASUREMENT OF GASEOUS AIR POLLUTION.
APTIC-26122 03

THE TECHNIQUES OF MEASUREMENT IN THE OIL HEATING CONTROL OF THE CITY OF ZURICH AND THE WAY OF ITS APPLICATION.
APTIC-26137 03

A COMPARISON OF METHODS FOR TESTING THE FASTNESS TO GAS FADING OF DYES ON ACETATE.
APTIC-26167 03

MEETINGS
A SCIENTIFIC-TECHNICAL CONFERENCE ON DECONTAMINATION OF INDUSTRIAL EFFLUENTS AND ATMOSPHERIC DISCHARGES.
APTIC-24627 14

APTIC-24627 14

SEMINAR ON 'REMOVAL OF GASES AND DUSTS FROM VENTILATING AIR AND INDUSTRIAL EMISSIONS'.
APTIC-26023 02

BESANCON.
APTIC-26225 13

MEMBRANE FILTERS
SURFACE COLLECTION EFFICIENCY OF LARGE-PORE MEMBRANE FILTERS.
APTIC-22169 03

EFFICIENCY OF IPC-1478 FILTER PAPER AGAINST POLYSTYRENE LATEX AND DIOCTYL PHTHALATE AEROSOLS.
APTIC-22190 03

METHOD AND EQUIPMENT FOR MAKING PREPARATIONS OF MICROSCOPIC PARTICLES OF SOLID SUBSTANCES.
APTIC-24598 03

THE MILLIPORE FILTER TECHNIQUE FOR ICE NUCLEI MEASUREMENT.
APTIC-24626 03

PERMEABLE MEMBRANE.
APTIC-24694 02

INVESTIGATION WITH THE ELECTRON MICROSCOPE OF AEROSOLS COLLECTED ON MEMBRANE FILTERS.
APTIC-24770 03

APTIC-24770 03

APPLICATION OF MERCURY-INTRUSION METHOD FOR DETERMINATION OF PORE-SIZE DISTRIBUTION TO MEMBRANE FILTERS.
APTIC-24856 02

A METHOD FOR TESTING HIGH EFFICIENCY MECHANICAL FILTERS FOR THE SEPARATION OF RADIOACTIVE AEROSOLS AND FOR PERSONAL PROTECTION.
APTIC-24967 02

ANALYTICAL METHODS FOR DETERMINATION OF AEROSOLS WITH HELP OF MEMBRANE ULTRAFILTERS. VI. ON THE MECHANISM OF MEMBRANE ULTRAFILTER ACTION.
APTIC-25956 03

ANALYTICAL METHODS FOR DETERMINATION OF AEROSOLS BY MEANS OF MEMBRANE ULTRAFILTERS. VII. DIFFUSION AND IMPACTION PRECIPITATION OF AEROSOL PARTICLES BY MEMBRANE ULTRAFILTERS.
APTIC-26266 03

MERCURY COMPOUNDS
APPLICATION OF MERCURY-INTRUSION METHOD FOR DETERMINATION OF PORE-SIZE DISTRIBUTION TO MEMBRANE FILTERS.
APTIC-24856 02

METABOLISM
THE METABOLISM OF LEAD IN MAN IN HEALTH AND DISEASE. PART II. THE METABOLISM OF LEAD UNDER ABNORMAL CONDITIONS.
APTIC-24614 07

THE BIOSYNTHESIS OF STERYL GLUCOSIDES IN PLANTS.
APTIC-24661 08

PHYSIOLOGIC PROCESSES IN ABSORPTION OF POLLUTANTS.
APTIC-25988 07

EFFECTS ON RAT OF CHRONC EXPOSURE OF LOW CONCENTRATION OF CO. PART I.
APTIC-26113 07

PROJECT REPORT LEAD.
APTIC-26215 07

METAL COMPOUNDS
REGIONAL DIFFERENCES IN THE DEPOSITION OF HEAVY METALS OVER SCANDINAVIA.
APTIC-23971 04

THERMODYNAMIC ANALYSIS OF THE REDUCTION OF SULFUR DIOXIDE BY METAL SULFIDES WITH THE FORMATION OF ELEMENTAL SULFUR.
APTIC-24703 06

HAIR TRACE METAL LEVELS AND ENVIRONMENTAL EXPOSURE.
APTIC-24716 07

METAL HYDRIDES AS A SOURCE OF FUEL FOR VEHICULAR PROPULSION.
APTIC-24746 02

THE DETERMINATION OF HEAVY METALS IN DUSTFALL BY ATOMIC-ABSORPTION-SPECTROPHOTOMETRY.
APTIC-25535 03

METALLIC MENACE IN THE ENVIRONMENT.
APTIC-25705 07

THE DERIVATION OF GALLIUM AND ALUMINUM FROM COAL AND GAS DUSTS AND ASHES.
APTIC-25744 02

IMPROVEMENT OF X-RAY SPECTROGRAPHIC ANALYSIS OF FILTRATION OF THE L LINES FROM THE PRIMARY BEAM.
APTIC-25822 03

QUANTITATIVE DETERMINATION OF METALLIC AIR POLLUTANTS BY EMISSION SPECTROSCOPIC ANALYSIS.
APTIC-26009 03

METAL FABRICATING AND FINISHING
VENTILATION AT NON-FERROUS MELTING AND POURING OPERATIONS.
APTIC-24607 02

DISPOSAL OF FUMES FROM PVC DURING COPPER RECOVERY.
APTIC-24819 02

METAL POISONING
STUDIES ON HUMAN AND EXPERIMENTAL LEAD POISONING. THE INHIBITORY MECHANISM OF RED BLOOD CELL ALA-DEHYDRATASE.
APTIC-24784 07

METEOROLOGICAL INSTRUMENTS
WIND DIRECTION, VELOCITY AND TURBULENCE INSTRUMENTATION FOR AIR POLLUTION DIAGNOSIS.
APTIC-24862 03

METEOROLOGICAL INSTRUMENTATION FOR AIR POLLUTION APPLICATIONS.
APTIC-25764 05

METEOROLOGY
AIR POLLUTION II. METEOROLOGICAL ASPECTS OF URBAN POLLUTION.
APTIC-24669 05

GAS RESISTANCE OF PINE AND BIRCH.
APTIC-24734 08

STATISTICAL PROCESSING OF DATA GATHERED BY THE RESEARCH REACTOR OF THE METEOROLOGICAL STATION IN MUNICH.
APTIC-25645 05

SENSING OF METEOROLOGICAL VARIABLES BY LASER PROBE TECHNIQUES. (FINAL REPORT).
APTIC-25796 05

SOME PROBLEMS OF ATMOSPHERIC CHEMISTRY.
APTIC-25925 03

POSSIBLE EFFECTS OF AIR POLLUTION ON THE COURSE OF INFECTIOUS RESPIRATORY DISEASE.
APTIC-25999 07

METEOROLOGICAL ASPECTS OF AIR POLLUTION AND SIMULATION MODELS OF DIFFUSION, TRANSPORT AND REACTIONS OF AIR POLLUTION TASK FORCE ASSESSMENT.
APTIC-26222 05

THE DIFFUSION OF SMOKE GASES FROM FACTORY CHIMNEYS AND ITS METEOROLOGICAL CONDITIONS.

APTIC-26267 05

METHANATION
SELECTIVE METHANATION OF CARBON MONOXIDE.
APTIC-25736 02

METHANES
PRODUCTION OF CARBON DISULFIDE FROM METHANE AND SULFUR DIOXIDE.
APTIC-24596 06

HYDROGEN SULFIDE FROM SULFUR DIOXIDE AND METHANE.
APTIC-24739 06

KINETIC EVIDENCE CONCERNING THE GEOMETRY OF SUBSTITUTED METHYL RADICALS.
APTIC-25985 06

IMPROVEMENTS RELATING TO METHODS OF AND INSTRUMENTS FOR MEASURING THE CONCENTRATION OF COMBUSTIBLE GAS IN AN AIR SAMPLE.
APTIC-26245 03

METROPOLITAN CINCINNATI INTERSTATE AIR QUALITY CONTROL REGION (MCIAQCR)
PROPOSED IMPLEMENTATION PLAN FOR THE CONTROL OF PARTICULATES AND SULFUR OXIDES FOR THE STATE OF OHIO PORTION OF THE METROPOLITAN CINCINNATI INTERSTATE AIR QUALITY CONTROL REGION.
APTIC-25688 12

METROPOLITAN CINCINNATI INTERSTATE AIR QUALITY CONTROL REGION
PROPOSED IMPLEMENTATION PLAN FOR THE CONTROL OF PARTICULATES AND SULFUR OXIDES FOR THE STATE OF INDIANA PORTION OF THE METROPOLITAN CINCINNATI INTERSTATE AIR QUALITY CONTROL REGION.
APTIC-25998 12

MEUSE VALLEY
AIR POLLUTION SMOKE AND SO2.
APTIC-26094 04

MEXICO
AIR POLLUTION ALONG THE MEXICAN-AMERICAN FRONTIER.
APTIC-26299 01

MEXICO CITY
AIR POLLUTION II. METEOROLOGICAL ASPECTS OF URBAN POLLUTION.
APTIC-24669 05

EVALUATION OF AIR POLLUTION IN THE VALLE DE MEXICO.
APTIC-26297 04

MICROBOMBS
MICRO-PARR ASSEMBLY SUITABLE FOR MICRODETERMINATION OF FLUORINE IN ORGANIC COMPOUNDS.
APTIC-25752 03

MICROMETEOROLOGY
ROTARY MACHINES FOR EXTREME CLIMATIC CONDITIONS.
APTIC-25741 09

INFLUENCE OF CLIMATE AND TOPOGRAPHY ON OXIDANT AIR POLLUTION CONCENTRATIONS THAT DAMAGE CONIFER FORESTS IN SOUTHERN CALIFORNIA.
APTIC-25792 05

REGARDING THE EFFECT OF PHYSICOGEOGRAPHIC CONDITIONS ON THE CONCENTRATION OF INDUSTRIAL EMISSIONS INTO THE ATMOSPHERE.
APTIC-25813 05

A MODEL OF GLOBAL CLIMATE AND ECOLOGY.
APTIC-25947 05

AN URBAN-CLIMATOLOGICAL STUDY OF THE ATTENUATION OF SOLAR RADIATION BY AIR POLLUTION IN TOKYO.
APTIC-26059 05

MICROORGANISMS
METHOD OF ELIMINATING SULFUR COMPOUNDS FROM OIL WITH THE USE OF MICROBES.
APTIC-24641 02

APTIC-24641 02

A STUDY OF THE POSSIBLE MOVEMENT OF MICROORGANISMS THROUGH SMALL ORIFICES. (FINAL REPORT).
APTIC-25687 06

THE BEHAVIOR OF THE AIR GERM COUNT IN AN ELECTROSTATIC FIELD.
APTIC-25877 02

MICROSCOPY
MICROSCOPIC IDENTIFICATION OF TOXIC DUSTS.
APTIC-25970 03

THE PRODUCTION OF TRANSPARENT PROFILES OF DUST PARTICLES AS AN AID TO AUTOMATIZED PARTICLE COUNTING.
APTIC-26183 03

MICROWAVE RESONANCES
COMBUSTION CHAMBER INVESTIGATIONS BY MEANS OF MICROWAVE RESONANCES.
APTIC-26268 03

MINERAL PROCESSING
DUST FALL IN THE VICINITY OF CEMENT FACTORIES AS IT RELATES TO POSSIBLE HEALTH HAZARDS PART 2.
APTIC-24708 07

PRELIMINARY EVALUATION OF CEMENT DUST FROM ELECTROFILTERS AS A POTASSIUM FERTILIZER.
APTIC-25609 02

ACTIVITIES RELATED TO THE NON-MINING INDUSTRIES.
APTIC-25794 02

HOW AIR POLLUTION CAN BE CONTROLLED IN A PLANT.
APTIC-25939 02

ON THE AIR POLLUTION BY RED OCHRE FACTORIES IN MITSU-CHO. OKAYAMA PREFECTURE, JAPAN.
APTIC-26029 04

STUDY ON THE WET-TYPE COLLECTOR USED ON THE PROCESS FOR THE PRODUCTION OF SLAKED LIME.
APTIC-26072 02

MINIMUM EFFECT DOSAGE LEVELS
RELATIONSHIP OF RESULTS OF LONG-TERM TOXICITY STUDIES TO THOSE OF SHORTER DURATION.
APTIC-24963 03

MINING
BRONCHIAL CANCER IN THE IRON MINER OF THE LORRAINE BASIN. (BASED ON 225 OBSERVATIONS).
APTIC-26001 07

MISSILES AND ROCKETS
ANALYSIS OF LOWER ATMOSPHERIC DATA FOR DIFFUSION STUDIES. (FINAL REPORT).
APTIC-24761 05

RISE AND GROWTH OF SPACE VEHICLE ENGINE EXHAUST AND ASSOCIATED DIFFUSION MODELS.
APTIC-25685 05

THE RISE OF BOUYANT CLOUDS.
APTIC-25819 05

MISTS
HIGH-EFFICIENCY FIBRE FILTERS FOR THE TREATMENT OF FINE MISTS.
APTIC-24695 02

TWO-STAGE MIST ELIMINATORS FOR SULFURIC ACID PLANTS.
APTIC-24833 02

LIQUID MIST COLLECTION.
APTIC-25717 02

FIBER MIST ELIMINATORS FOR HIGHER VELOCITIES.
APTIC-26095 02

MIZUSHIMA
STUDIES ON AIR POLLUTION OF NEW DEVELOPING INDUSTRIAL CITY MIZUSHIMA, OKAYAMA PREFECTURE.
APTIC-26043 04

ON THE TYPE OF AIR POLLUTION OF MIZUSHIMA, OKAYAMA PREFECTURE.
APTIC-26282 04

MOLTEN SALTS
REMOVAL OF LEAD FROM AUTOMOBILE EXHAUSTS BY MOLTEN SALTS.
APTIC-26064 02

MONITORING
MEASURING METHOD OF AIR POLLUTANTS DUE TO AUTOMOBILE EXHAUST.
APTIC-24644 03

MORTALITY
REPORT ON THE EPIDEMIOLOGICAL INVESTIGATION OF THE HEALTH EFFECTS OF AIR POLLUTION AND REPORT ON THE INVESTIGATION OF INFANT DEATHS IN THE YOKKAICHI DISTRICT.
APTIC-26169 07

MOTOR VEHICLE ACCIDENTS
POSSIBLE ASSOCIATION OF MOTOR VEHICLE ACCIDENTS WITH POLLUTANT LEVELS IN LOS ANGELES.
APTIC-26247 07

MOUNTAINS
CURRENT CONDITIONS AND SCIENTIFIC PROBLEMS IN STUDYING THE INJURIOUS EFFECTS OF INDUSTRIAL POLLUTANTS ON PLANTS AND IN DEVELOPING METHODS FOR CONTROLLING THEM IN THE URALS.
APTIC-24867 08

MULTIPLE CHAMBER INCINERATORS
A COMPARISON OF NAPCA AND IIA SOURCE SAMPLING METHODS.
APTIC-24582 03

RESEARCH FINDINGS IN STANDARDS OF INCINERATOR DESIGN.
APTIC-24767 02

MUNICH
STATISTICAL PROCESSING OF DATA GATHERED BY THE RESEARCH REACTOR OF THE METEOROLOGICAL STATION IN MUNICH.
APTIC-25645 05

MUTATIONS
INTERACTION OF BENZO(A)PYRENE (BAP) WITH MAMMALIAN CELLS IN CULTURE.
APTIC-25850 07

MYOCARDIAL INFARCTION
CARBON MONOXIDE LEVELS IN ACUTE MYOCARDIAL INFARCTION.
APTIC-25578 07

NASOPHARYNGEAL CARCINOMA
NASOPHARYNGEAL CARCINOMA AND ENVIRONMENTAL CARCINOGENS.
APTIC-24880 07

NATIONAL AEROMETRIC DATA BANK
THE NATIONAL AEROMETRIC DATA BANK.
APTIC-24121 04

NATURAL GAS
REBIRTH OF A BOILERHOUSE.
APTIC-24854 02

THE REVAPORIZATION OF LIQUEFIED NATURAL GAS.
APTIC-24919 02

LNG PIPELINES - A STATUS SURVEY.
APTIC-25697 02

PRODUCTION OF SOUR GAS-SULFUR WELLS EMPLOYING A SULFUR SOLVENT.
APTIC-25708 02

THE LIQUEFIED NATURAL GAS PLANT OF THE 'WISCONSIN NATURAL' COMPANY AND ITS SPECIAL CHARACTERISTICS.
APTIC-25745 02

FIRST NATURAL GAS LIQUEFACTION PLANT.
APTIC-25748 02

EXAMPLES OF CITY-GAS COMBUSTION IN BOILERS.
APTIC-25868 02

LIQUEFIED NATURAL GAS AS INDUSTRIAL FUEL.
APTIC-25893 02

NEEDLE BLIGHT
THE RELATIONSHIPS OF OZONE, LOPHODERMIUM PINASTRI AND PULLULARIA PULLULANS TO NEEDLE BLIGHT OF EASTERN WHITE PINE.
APTIC-24796 08

NEON
CONTINUOUSLY WORKING PLANT FOR THE SEPARATION OF NEON-HELIUM MIXTURES.
APTIC-25809 02

NERVOUS SYSTEM
PSYCHOPHARMACOLOGY OF CARBON MONOXIDE UNDER AMBIENT AND ALTITUDE CONDITIONS.
APTIC-24958 07

NEUROLOGIC MANIFESTATIONS OF CHRONIC CARBON MONOXIDE POISONING.
APTIC-25695 07

EXPERIMENTAL CARBON MONOXIDE POISONING ITS ELECTROPHYSIOLOGICAL EFFECTS ON THE VISUAL PATHWAY IN CATS.
APTIC-25836 07

BIOCHEMICAL STUDIES ON THE TOXICITY OF TETRAETHYL LEAD AND OTHER ORGANO-LEAD COMPOUNDS.
APTIC-25847 07

EFFECTS ON RAT OF CHRONC EXPOSURE OF LOW CONCENTRATION OF CO. PART I.
APTIC-26113 07

PERMANENT DAMAGE TO THE NERVOUS SYSTEM CAUSED BY CARBON MONOXIDE POISONING OF A FETUS.
APTIC-26160 07

A FOLLOW-UP STUDY OF LEAD WORKERS.
APTIC-26177 07

NEUTRON ACTIVATION ANALYSIS
ACTIVATION ANALYSIS OF AIRBORNE SELENIUM AS A POSSIBLE INDICATOR OF ATMOSPHERIC SULFUR POLLUTANTS.
APTIC-26069 03

NEW CUMBERLAND
NEW CUMBERLAND, WEST VIRGINIA -- KNOX TOWNSHIP, OHIO -- AIR POLLUTION ABATEMENT ACTIVITY.
APTIC-26087 04

NEW YORK CITY
ENVIRONMENTAL PROTECTION IN THE CITY OF NEW YORK.
APTIC-24636 12

INTERMITTENT AIR POLLUTION EPISODE IN NEW YORK CITY, 1962.
APTIC-25829 07

AREA METEOROLOGY.
APTIC-25855 05

NEW YORK STATE
THE NEW YORK STATE CONTINUOUS AIR QUALITY MONITORING SYSTEM.
APTIC-23762 03

ADMINISTRATIVE NEEDS AND PATTERNS OF AIR-POLLUTION CONTROL.
APTIC-25774 12

NIIGATA PREFECTURE
REPORT ON AIR POLLUTION STUDY, NAOETSU REGION.
APTIC-26026 04

NITRATES
REACTIONS OF METAL NITRATES IN MOLTEN SULFUR.
APTIC-22814 01

ON THE INTERCELLULAR NITRATE IN THE LEAVES AND ROOTS OF BARLEY.
APTIC-24850 08

COMBATTING THE EFFECTS OF SMOG ON WIRE-SPRING RELAYS.
APTIC-25606 09

NITRATION
REACTIONS OF METAL NITRATES IN MOLTEN SULFUR.
APTIC-22814 01

NITRIC OXIDE (NO)
HYDROCARBON REACTIVITIES IN THE ATMOSPHERIC PHOTOOXIDATION OF NITRIC OXIDE.
APTIC-24660 05

ABSORPTION OF NO AND NO2 IN SMALL AND LARGE CONCENTRATIONS THROUGH INHALATION.
APTIC-24820 07

INHIBITION OF ATMOSPHERIC PHOTOOXIDATION OF HYDROCARBONS BY NITRIC OXIDE.
APTIC-24946 05

DETERMINATION OF NO2 AND NO IN AIR.
APTIC-25918 03

POWER AND INDUSTRY CONTROL OF NITROGEN OXIDE EMISSIONS.
APTIC-26226 02

TOXICOLOGICAL ASPECTS OF ATMOSPHERIC NITROGEN OXIDES.
APTIC-26271 07

RESPECTIVE DETERMINATION OF NO AND NO2.
APTIC-26291 03

NITRILES
IONIZATION-CHROMATOGRAPHIC DETERMINATION OF NITRILES IN THE 6ATMOSPHERE.
APTIC-24693 03

NITRITES
DETERMINATION OF 2-NITROPROPANE AND OF NITRITE IN MIXTURES.
APTIC-25824 03

NITROGEN
THE PHOTOELECTRON SPECTRA OF O2, N2 AND CO.
APTIC-24889 06

NITROGEN DIOXIDE (NO2)
THERMODYNAMIC CONSIDERATIONS IN THE INTERACTIONS OF NITROGEN OXIDES AND OXY-ACIDS IN THE ATMOSPHERE.
APTIC-24015 05

TOXICITY OF NO2 VAPORS AT VERY LOW LEVELS. A PRELIMINARY REPORT.
APTIC-24588 07

NITROGEN DIOXIDE IMMISSIONS IN SOME SELECTED DISTRICTS OF THE STATE OF NORDRHEIN-WESTFALEN.
APTIC-24807 04

ABSORPTION OF NO AND NO2 IN SMALL AND LARGE CONCENTRATIONS THROUGH INHALATION.
APTIC-24820 07

THE USE OF SILOXENE FOR DETERMINING SMALL AMOUNTS OF NITROGEN DIOXIDE.
APTIC-24839 03

CONTINUOUS SAMPLING AND ULTRAMICRODETERMINATION OF NITROGEN DIOXIDE IN AIR.
APTIC-24900 03

AEROSOL FORMATION FROM GASEOUS AIR POLLUTANTS.
APTIC-24921 05

EFFECTS ON CANINE PULMONARY FUNCTION VIA INDUCED NO2 IMPAIRMENT, PARTICULATE INTERACTION, AND SUBSEQUENT SOX.
APTIC-24940 07

NITROGEN DIOXIDE POISONING IN SILO ATMOSPHERES. (SILO-FILLERS' DISEASE).
APTIC-25586 07

THE EFFECT OF AIR POLLUTANTS ON POLYMERS.
APTIC-25680 09

A STUDY OF THE EFFECTS OF AIR POLLUTANTS ON THE EYE.
APTIC-25756 07

HEALING IN RAT LUNG AFTER SUBACUTE EXPOSURE TO NITROGEN DIOXIDE.
APTIC-25759 07

DETERMINATION OF NO2 AND NO IN AIR.
APTIC-25918 03

OXIDATION OF ETHYLENE BY THE PHOTOLYSIS OF NO2 AT 25 C.
APTIC-25941 06

THERMODYNAMIC FUNCTIONS FOR NITROGEN DIOXIDE AND NITROUS ACID.
APTIC-25958 06

NITROGEN DIOXIDE AND LOWER RESPIRATORY ILLNESS.
APTIC-25966 07

PATHOBIOLOGY OF AIR POLLUTANTS.
APTIC-25971 07

SOME OBSERVATIONS ON ANIMALS EXPOSED TO AIR POLLUTANTS ESPECIALLY SULPHUR OXIDES.

APTIC-26116 07

THE EFFECT OF O3, NO2, AND SO2 EXPOSURE ON THE EXPERIMENTAL ASTHMA IN GUINEAPIGS.
APTIC-26117 07

A COMPARISON OF METHODS FOR TESTING THE FASTNESS TO GAS FADING OF DYES ON ACETATE.
APTIC-26167 03

REACTIONS IN THE ATMOSPHERE.
APTIC-26229 05

ELECTRONIC ABSORPTION SPECTRA OF INORGANIC AND ORGANIC COMPOUNDS OF NITROGEN. I. NITROGEN DIOXIDE-DINITROGEN TETROXIDE IN SOLUTION.
APTIC-26253 06

TOXICOLOGICAL ASPECTS OF ATMOSPHERIC NITROGEN OXIDES.
APTIC-26271 07

STUDIES ON PUBLIC NUISANCE CAUSED BY AIR POLLUTION. 2. AIR POLLUTION IN TAJIMI CITY.
APTIC-26289 04

RESPECTIVE DETERMINATION OF NO AND NO2.
APTIC-26291 03

NITROGEN OXIDES
SYSTEMS STUDY OF NITROGEN OXIDE CONTROL METHODS FOR STATIONARY SOURCES.
APTIC-12619 02

OXIDES OF NITROGEN AS A FACTOR IN COLOR CHANGES OF USED AND LAUNDERED COTTON ARTICLES.
APTIC-24608 09

CONTROL OF NITROGEN OXIDE EMISSIONS FROM STATIONARY COMBUSTION SOURCES.
APTIC-24678 02

EXPERIMENTAL STUDY OF THE EFFECT OF NITROGEN DIOXIDE ON PLANTS.
APTIC-24808 08

TACKLING THE PROBLEM OF NITROGEN OXIDES.
APTIC-24922 02

REACTION OF NITROGEN OXIDES WITH BIOLOGICALLY IMPORTANT AMINES.
APTIC-25580 06

SOME EXPERIMENTS FOR CONTROLLING OF NITROGEN OXIDES IN DIESEL ENGINE EXHAUST GAS.
APTIC-25587 02

CHEMICAL SUPPRESSION OF NITROGEN OXIDES.
APTIC-25714 02

EXTENSIVE PULMONARY CHANGES IN AN APPARENTLY LIGHT NITROGEN OXIDES POISONING.
APTIC-25747 07

A COMPARISON OF THE EFFECT ON RAYON FABRICS OF VARIOUS GASES UNDER CONTROLLED CONDITIONS.
APTIC-25772 09

OXIDES OF NITROGEN IN THE COMBUSTION PRODUCTS OF AN AMMONIA FUELED RECIPROCATING ENGINE.
APTIC-25825 01

ADJUST SPARK ADVANCE TO CONTROL NOX.
APTIC-26017 02

AIR POLLUTION.
APTIC-26071 02

NITROUS ACID
THERMODYNAMIC FUNCTIONS FOR NITROGEN DIOXIDE AND NITROUS ACID.
APTIC-25958 06

NITROUS ANHYDRIDE (N2O3)
ADDITION OF DINITROGEN TRIOXIDE TO NONCONJUGATED DIENES.
APTIC-24165 06

NITROUS OXIDE (N2O)
THE PATHODYNAMICS OF HEMOPOIESIS SUPPRESSION BY NITROUS OXIDE.
APTIC-25667 08

CHANGES IN ROTATIONAL CONSTANTS IN SOME PI-SIGMA BANDS OF NCN AND N2O.
APTIC-25673 06

NON-URBAN AREAS
CONDENSATION NUCLEI PRODUCTION OF VERY LARGE NUMBERS IN COUNTRY AIR.
APTIC-24843 05

BENZPYRENE CONTENT OF DUST SAMPLES COLLECTED ON URBAN AND RURAL SETTLEMENTS AND IN INDUSTRIAL PLANTS 3,4.
APTIC-25565 04

URBAN-RURAL DIFFERENCES IN LUNG CANCER MORTALITY RATES IN THE STATE.
APTIC-25849 07

INCIDENCE OF CHRONIC BRONCHITIS AND OF RESPIRATORY INSUFFICIENCY IN AN INDUSTRIAL RURAL POPULATION.
APTIC-25875 07

THE INFLUENCE OF AIR POLLUTION. 3.1. THE INFLUENCE OF AIR POLLUTION ON TREES. 2. THE CHARACTERISTICS OF INSOLUBLE SUBSTANCES ADHERED TO THE LEAVES OF ROADSIDE TREES.
APTIC-26035 08

NORDRHEIN-WESTFALEN
INITIATIVE FOR WATER AND AIR POLLUTION CONTROL.
APTIC-24683 02

NITROGEN DIOXIDE IMMISSIONS IN SOME SELECTED DISTRICTS OF THE STATE OF NORDRHEIN-WESTFALEN.
APTIC-24807 04

NORWAY
PNEUMONIA IN THE AREA OF THE SAUDA FACTORIES OF RYFLYKE.
APTIC-24506 07

NUCLEAR POWER PLANTS
PLUME EFFECTS OF NATURAL DRAFT HYPERBOLIC COOLING TOWERS.
APTIC-24835 05

A REVIEW AND COMPARISON OF SELECTED UNITED STATES ENERGY FORECASTS.
APTIC-26085 01

NUCLEATION
THE MILLIPORE FILTER TECHNIQUE FOR ICE NUCLEI MEASUREMENT.
APTIC-24626 03

A CONDENSATION NUCLEI COUNTER WITH AN EXPANSION PROGRAMME.
APTIC-24780 03

ON THE ORIGIN OF ICE NUCLEI.
APTIC-24926 05

STEADY STATE AND NON-STEADY STATE DIFFUSION THEORY OF DROPLET GROWTH.
APTIC-25634 05

AN EXPERIMENTAL INVESTIGATION OF THE EFFECT OF AIR POLLUTION ON THE INITIATION OF RAIN.
APTIC-25639 05

ICE NUCLEI FROM DIRECT REACTION OF IODINE VAPOR WITH VAPORS FROM LEADED GASOLINE.
APTIC-26191 01

OCCUPATIONAL HEALTH
PROPOSAL FOR A UNIFORM EVALUATION OF THE DANGER OF PNEUMOCONIOSIS.
APTIC-24649 07

PROPERTIES OF OZONE AS AN INDUSTRIAL POISON.
APTIC-24741 07

ASSESSING THE DEGREE OF EXPOSURE TO DUST AND OCCUPATIONAL EPIDEMIOLOGY.
APTIC-25543 07

AIR POLLUTION FROM SOLDERING FUMES.
APTIC-25624 07

A HEALTH-SOCIOLOGICAL STUDY ON PNEUMOCONIOSIS IN A COPPER MINE AFTER THE ENFORCEMENT OF THE PNEUMOCONIOSIS LAW.
APTIC-25722 07

SULFUR DIOXIDE.
APTIC-25751 07

THE WORK OF AN OCCUPATIONAL HYGIENE SERVICE IN ENVIRONMENTAL CONTROL.
APTIC-25767 07

THE EFFECT OF PROLONGED EXPOSURE TO CARBON MONOXIDE ON HUMAN HEALTH.
APTIC-25810 07

THE TOXICOLOGICAL BASIS OF THRESHOLD LIMIT VALUES 1. EXPERIENCE WITH THRESHOLD LIMIT VALUES BASED ON ANIMAL DATA.
APTIC-25917 11

TETRAMETHYLLEAD AS SUBSTITUTE FOR TETRAETHYLLEAD.
APTIC-25944 07

OCEANS
REMOVAL OF SULFUR DIOXIDE FROM STACK GASES BY SEA WATER.
APTIC-26248 02

ODAWARA
A STATISTICAL STUDY ON CHRONIC RESPIRATORY DISEASE AMONG STUDENTS OF JUNIOR HIGH SCHOOL IN ODAWARA CITY.
APTIC-26283 07

ODOR COUNTERACTION
IS IT POSSIBLE TO BUILD AND OPERATE A COMPLETELY ODORLESS KRAFT MILL
APTIC-24903 02

GASSING....THE BUG-A-BOO OF THE BUS BUSINESS.
APTIC-25594 03

ODOR CONTROL WITH CHLORINE CUTS COST.
APTIC-25623 02

ON PROTECTION AGAINST EMISSION REMOVAL OF OFFENDING SMELLS.
APTIC-25858 02

AIR POLLUTION CAUSED BY AGRICULTURE AND FORESTRY ODOR.
APTIC-25977 02

ODOR CONTROL IN FISH AND BONE MEAL FACTORIES IN NORTH EUROPE. (III). (DE LAVAL SYSTEM AND ATV SYSTEM).
APTIC-26002 02

QUALITATIVE ANALYSES OF ODOR COMPONENTS IN THE PYROLYSIS OF FEATHER IN THE LABORATORY TEST.
APTIC-26014 02

THE REMOVALS FOR THE STINKING COMPOUNDS BY SPRAYING THE DEODORANT SOLUTIONS. (1).
APTIC-26056 02

RESEARCH ON ODOR CONTROL IN THE U.S.A. (A CHAPTER OF RENDERING PLANTS IN WEST COAST).
APTIC-26057 12

DEODORIZING EQUIPMENT AND DEODORANTS.
APTIC-26128 02

OXIDATION OF KRAFT BLACK LIQUOR -- WHERE DOES IT STAND
APTIC-26172 02

RECENT DEVELOPMENTS IN BLACK LIQUOR OXIDATION.
APTIC-26173 02

ELIMINATION OF ODORS IN A SULPHATE PULP MILL.
APTIC-26176 02

REMOVAL OF ODOR OF ORGANIC SOLVENT AND UTILIZATION OF RECOVERED HEAT BY U.O.P. CATALYTIC COMBUSTION SYSTEM.
APTIC-26308 02

ODORIMETRY
CHEMISTRY OF SMELL.
APTIC-24814 03

GASSING....THE BUG-A-BOO OF THE BUS BUSINESS.
APTIC-25594 03

ODOR INTENSITY.
APTIC-26096 03

STUDIES IN THE PSYCHOLOGY OF OLFACTION (3). QUALITATIVE CLASSIFICATION OF ODOURS.
APTIC-26309 03

ODORS
RESULTS OF THERMAL AND OF CATALYTIC PROCESSES TO LIMIT OLFACTORY EMISSIONS OF ORGANIC CHEMICAL COMPOUNDS.
APTIC-24754 02

NATIONAL SURVEY OF THE ODOR PROBLEM. PHASE I OF A STUDY OF THE SOCIAL AND ECONOMIC IMPACT OF ODORS APPENDIX.
APTIC-24768 13

IS IT POSSIBLE TO BUILD AND OPERATE A COMPLETELY ODORLESS KRAFT MILL
APTIC-24903 02

A PROCESS FOR THE NEUTRALIZATION OF TOXIC VAPOURS AND WASTE GASES.
APTIC-24969 02

ODOR INTENSITY.
APTIC-26096 03

OHIO
RECOMMENDATIONS AND SUMMARY OF PARKERSBURG, W. VA.-MARIETTA, OHIO, INTERSTATE AIR POLLUTION ABATEMENT CONFERENCE.
APTIC-24858 12

PARKERSBURG, WEST VIRGINIA--MARIETTA, OHIO, AIR POLLUTION ABATEMENT ACTIVITY SUPPLEMENTAL TECHNICAL REPORT.
APTIC-25780 04

OKAYAMA
ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE (I).
APTIC-26045 04

ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE. (II).
APTIC-26302 04

ONTARIO
ONTARIO'S AIR POLLUTION INDEX.
APTIC-24635 04

OPEN BURNING
AIR POLLUTION CAUSED BY AGRICULTURE, FORESTRY AND THE FOREST PRODUCTS INDUSTRIES COMBUSTION.
APTIC-26255 02

OPERATING VARIABLES
FACTORS INFLUENCING THE EFFICIENT OPERATION OF ELECTROSTATIC PRECIPITATORS FOR PULVERISED-FUEL ASH.
APTIC-24630 02

TRENDS OF CLEANING SUPPLY AND EXHAUST AIR IN PROCESS ENGINEERING.
APTIC-24654 02

CONTROL OF POWER PLANT EMISSIONS.
APTIC-24837 02

REBIRTH OF A BOILERHOUSE.
APTIC-24854 02

AIR HUMIDITY AND BRUSH CONTACT DROP THE EFFECT OF WATER VAPOR, SULFUR DIOXIDE, AND HYDROGEN SULFIDE.
APTIC-24943 09

DE-ENTRAINMENT IN PLATE COLUMN.
APTIC-25573 02

EXPERIMENTS ON ANISOKINETIC SAMPLING ERRORS FOR SOLID-LIQUID TWO-PHASE FLOW.
APTIC-25574 03

MAINTENANCE AND MANAGEMENT OF AUTOMATIC-TYPE AIR CLEANERS.
APTIC-25723 02

THE MAINTENANCE AND PRESERVATION OF THE EFFICIENCY OF AN ELECTRIC AIR-CLEANING DEVICE.
APTIC-25724 02

CHARACTERISTICS AND APPLICATION OF HIGH PERFORMANCE DRY FILTERS.
APTIC-25766 02

TRICKLING PACKED BED REACTORS.
APTIC-26065 02

ESTIMATION FOR INITIAL COLLECTION EFFICIENCY OF A FIBROUS MAT FILTER.
APTIC-26301 02

OPINION SURVEYS
ADMINISTRATIVE NEEDS AND PATTERNS OF AIR-POLLUTION CONTROL.
APTIC-25774 12

ORBITAL PHOTOGRAPHY
ORBITAL PHOTOS APPLIED TO THE ENVIRONMENT.
APTIC-26187 03

ORGANIC ACIDS
IMPROVEMENTS IN RECOVERY OF SULPHUR DIOXIDE FROM GASES.
APTIC-24591 02

ORGANIC NITROGEN COMPOUNDS
DETAILED DETERMINATION OF NITROGEN COMPOUNDS CONTAINED IN WASTE GASES.
APTIC-24682 03

ULTRAVIOLET ABSORPTION OF ALIPHATIC NITRO COMPOUNDS IN THE PRESENCE OF A BASE.
APTIC-25948 03

ORGANIC SULFUR COMPOUNDS
METHOD OF ELIMINATING SULFUR COMPOUNDS FROM OIL WITH THE USE OF MICROBES.
APTIC-24681 02

APTIC-24681 02

OSAKA
REPORT ON THE STUDY OF AIR POLLUTION IN NISHIYODOGAWA WARD.
APTIC-26031 04

AIR POLLUTION.
APTIC-26293 04

OVARIAN CANCER
OVARIAN CANCER AND ASBESTOS.
APTIC-24942 07

OXIDANTS
A COMPARATIVE STUDY OF OXIDANTS AND OZONE IN LOS ANGELES ATMOSPHERE.
APTIC-24597 03

BIOLOGICAL SYSTEMS FOR THE IDENTIFICATION AND DISTRIBUTION OF AIR POLLUTANTS.
APTIC-24766 08

INFLUENCE OF CLIMATE AND TOPOGRAPHY ON OXIDANT AIR POLLUTION CONCENTRATIONS THAT DAMAGE CONIFER FORESTS IN SOUTHERN CALIFORNIA.
APTIC-25792 05

HEALTH EFFECTS OF PHOTOCHEMICAL OXIDANTS.
APTIC-26223 07

POSSIBLE ASSOCIATION OF MOTOR VEHICLE ACCIDENTS WITH POLLUTANT LEVELS IN LOS ANGELES.
APTIC-26247 07

OXIDATION
OZONE AND LIPID PEROXIDATION.
APTIC-24953 07

OXOSYNTHESIS
THE OXOSYNTHESIS OF PROPIONIC ALDEHYDE IN A THIN LAYER REACTOR.
APTIC-25830 06

OXYGEN
PRODUCTION AND DESTRUCTION MECHANISMS FOR O2 (1 DELTA G) IN THE LOWER ATMOSPHERE.
APTIC-24836 05

THE PHOTOELECTRON SPECTRA OF O2, N2 AND CO.
APTIC-24989 06

SOLUBILITY OF O2 AND CO IN BLOOD AND PULMONARY AND PLACENTAL TISSUE.
APTIC-24892 07

OXYGEN CONVERTERS
IMPROVING THE GAS CLEANING ON 100 T OXYGEN CONVERTERS.
APTIC-24809 02

OXYGEN-18

OXYGEN-18 VARIATIONS IN ATMOSPHERIC CARBON DIOXIDE THE HASL DATA.
APTIC-26077 05

OZONE
OZONE. A HANDBOOK OF PHYSICAL AND TECHNICAL DATA.
APTIC-22731 01

OZONE SYNTHESIS FOR WATER TREATMENT BY HIGH ENERGY RADIATION.
APTIC-24041 06

A COMPARATIVE STUDY OF OXIDANTS AND OZONE IN LOS ANGELES ATMOSPHERE.
APTIC-24597 03

A PARTIAL POLLUTION SOLUTION PLANT TREES.
APTIC-24622 02

AN EXPRESS DETERMINATION OF OZONE CONCENTRATION IN THE AIR.
APTIC-24691 03

OZONE ABSORPTION COEFFICIENTS IN THE VISIBLE AND ULTRAVIOLET REGIONS.
APTIC-24701 06

PROPERTIES OF OZONE AS AN INDUSTRIAL POISON.
APTIC-24741 07

HIGH ALTITUDE RADIATION MEASUREMENTS. (QUARTERLY REPORT).
APTIC-24753 03

AUTHOR'S REPLY TO THE PRECEDING DISCUSSION.
APTIC-24774 05

DISCUSSION OF PAPER BY J. KROENING AND E. P. NEY, 'ATMOSPHERIC OZONE.'
APTIC-24775 05

THE RELATIONSHIPS OF OZONE, LOPHODERMIUM PINASTRI AND PULLULARIA PULLULANS TO NEEDLE BLIGHT OF EASTERN WHITE PINE.
APTIC-24796 08

OZONE CRACKING OF RUBBERS.
APTIC-24799 09

ATMOSPHERIC OZONE.
APTIC-24929 03

APTIC-24929 03

OZONE AND LIPID PEROXIDATION.
APTIC-24953 07

STUDIES ON THE COMBINED EFFECTS OF OZONE AND A HOT ENVIRONMENT ON REACTION TIME IN SUBHUMAN PRIMATES.
APTIC-25579 07

CORROSION ASPECTS OF AIR POLLUTION IN THE SAN FRANCISCO BAY AREA--RUBBER PRODUCTS.
APTIC-25585 09

CHEMILUMINESCENT MEASUREMENT OF ATMOSPHERIC OZONE RESPONSE CHARACTERISTICS AND OPERATING VARIABLES.
APTIC-25653 03

CHEMILUMINESCENT METHOD OF DETECTING OZONE.
APTIC-25710 03

A STUDY OF THE EFFECTS OF AIR POLLUTANTS ON THE EYE.
APTIC-25756 07

AIR POLLUTION AND SOUTHERN FORESTS.
APTIC-25769 08

BIBLIOGRAPHICAL STUDY OF THE ABSORBENT PROPERTIES OF OZONE IN THE ULTRAVIOLET RANGE.
APTIC-25788 05

THE THEORETICAL CALCULATION OF THE DISTRIBUTION OF PHOTOCHEMICALLY-FORMED OZONE IN THE ATMOSPHERE.
APTIC-25924 05

ADAPTATION TO OZONE.
APTIC-25986 07

OZONE CHEMILUMINESCENT STUDY. FINAL REPORT. PART II. RADIOACTIVE OZONE GENERATOR.
APTIC-26082 03

EFFECT OF IN VITRO EXPOSURE TO O3 ON SURFACE TENSION OF LUNG EXTRACT.
APTIC-26115 07

THE EFFECT OF O3, NO2, AND SO2 EXPOSURE ON THE EXPERIMENTAL ASTHMA IN GUINEAPIGS.
APTIC-26117 07

ATMOSPHERIC OZONE CONCENTRATION AT GROUND LEVEL, PORT AUX FRANCAIS STATION (KERGUELEN ISLANDS).
APTIC-26151 04

TOXICITY OF OZONE. II. EFFECT OF OXYGEN AND CARBON DIOXIDE UPON ACUTE TOXICITY.
APTIC-26188 07

TOXICITY OF OZONE. IV. SILICONE AEROSOLS AND ALCOHOL VAPOR THERAPY IN OZONE POISONING.
APTIC-26217 07

THE EFFECT OF OZONE IN THE ANTI-BACTERIAL DEFENSE MECHANISMS OF THE MURINE LUNG.
APTIC-26249 07

OZONIDES
CRYSTAL STRUCTURE DETERMINATION OF STABLE OZONIDES.
APTIC-25953 06

PACKED TOWERS
THE SOLUTION OF AIR POLLUTION CAN CAUSE WATER POLLUTION.
APTIC-24842 02

THE ABSORPTION OF SULFUR DIOXIDE IN WATER.
APTIC-24868 02

RECOVERING ELEMENTAL SULFUR FROM WATERS CONTAINING HYDROGEN SULFIDE.
APTIC-25884 02

TESTING OF AN EXPERIMENTAL INDUSTRIAL ABSORBER WITH MOBILE PACKING.
APTIC-26019 02

AN EXAMPLE OF FORMALDEHYDE GAS CONTROL PROJECT.
APTIC-26074 02

PALLADIUM
PALLADIUM DEVICES FOR GAS CHROMATOGRAPHY.
APTIC-24665 03

PAPER CHROMATOGRAPHY
DETECTION OF POLLEN FLAVONOIDS BY FLUORESCENCE ON IMPREGNATED PAPERS.
APTIC-25928 03

AIR SAMPLING AND ANALYSIS OF LEAD ON PAPER.
APTIC-25949 03

PAPER MANUFACTURING
IS IT POSSIBLE TO BUILD AND OPERATE A COMPLETELY ODORLESS KRAFT MILL
APTIC-24903 02

AIR POLLUTION PROBLEMS IN THE WOOD PRODUCTS INDUSTRY.
APTIC-25683 01

INCIDENCE OF CHRONIC BRONCHITIS AND OF RESPIRATORY INSUFFICIENCY IN AN INDUSTRIAL RURAL POPULATION.
APTIC-25875 07

PARTIAL PRESSURE
CARBON MONOXIDE PARTIAL PRESSURE IN TISSUE OF DIFFERENT ANIMALS.
APTIC-25562 07

PARTICLE COUNTERS
A CONDENSATION NUCLEI COUNTER WITH AN EXPANSION PROGRAMME.
APTIC-24780 03

PARTICLE COUNTING TECHNIQUES AVAILABLE FOR AEROSOL RESEARCH.
APTIC-24873 03

RESPONSE CALCULATIONS FOR SIDEWAYS LIGHT SCATTERING AEROSOL PARTICLE COUNTERS.
APTIC-25721 03

A SCATTERED LIGHT MEASURING DEVICE FOR HIGH CONCENTRATIONS OF DUST.
APTIC-25870 03

THE DESIGN AND CONSTRUCTION OF A PHOTOELECTRONIC SCANNING MACHINE FOR SIZING MICROSCOPIC PARTICLES.
APTIC-25943 03

REPRESENTATION OF PARTICLE-SIZE DISTRIBUTIONS BY MEANS OF A SIMPLE SPECTROMETER AS AN ACCESSORY TO SCATTERED LIGHT MEASURING DEVICES.
APTIC-26062 03

THEORY OF PARTICLE SIZING AND COUNTING BY TRACK SCANNING.
APTIC-26097 03

THE PRODUCTION OF TRANSPARENT PROFILES OF DUST PARTICLES AS AN AID TO AUTOMATIZED PARTICLE COUNTING.
APTIC-26183 03

PARTICLE DEPOSITION
PARTICLE TRAJECTORIES AND CAPTURE OF PARTICLES BY A SPHERE.
APTIC-25827 06

PARTICLE GROWTH
DEVELOPMENT OF MOLECULAR CONDENSATION NUCLEI AND CONDITIONS FOR ITS OBSERVATION.
APTIC-24764 06

CONDENSATION NUCLEI PRODUCTION OF VERY LARGE NUMBERS IN COUNTRY AIR.
APTIC-24843 05

STEADY STATE AND NON-STEADY STATE DIFFUSION THEORY OF DROPLET GROWTH.
APTIC-25634 05

COLLISION-RATE THEORY AND THE COAGULATION OF FREE-MOLECULE AEROSOLS.
APTIC-25984 05

PARTICLE SIZE
APPLICATION OF HETEROGENEITY EFFECTS ENCOUNTERED IN THE ABSORPTION AND EMISSION OF X-RAYS TO ON-STREAM SENSING OF VARIABLES SUCH AS PARTICLE SIZE.
APTIC-24600 03

TRENDS OF CLEANING SUPPLY AND EXHAUST AIR IN PROCESS ENGINEERING.
APTIC-24654 02

EFFECT OF PARTICLE SIZE ON THE DETERMINATION OF INORGANIC SULFUR IN COAL.
APTIC-24725 03

MEASUREMENT OF AVERAGE PARTICLE SIZE IN AEROSOLS BY LIGHT SCATTERING.
APTIC-24791 03

AIR POLLUTION IN HOLLAND.
APTIC-24915 02

ON THE SEPARATION OF AIRBORNE MATTER BY INERTIA EFFECT IN THE SUBMICRONIC RANGE.
APTIC-25771 03

ON THE SIMULTANEOUS MEASUREMENTS OF THE PARTICLE SIZE DISTRIBUTION OF RADIOACTIVE CHARGED AEROSOLS AND CONCENTRATION RATIO OF POSITIVE TO NEGATIVE.
APTIC-25834 03

CENTRIFUGE SEDIMENTATION SIZE ANALYSIS OF SAMPLES OF AIRBORNE DUSTS COLLECTED IN MEMBRANE FILTERS.
APTIC-25843 03

A SCATTERED LIGHT PARTICLE-SIZE SPECTROMETER FOR SUBMICROSCOPIC AEROSOLS OF HIGH CONCENTRATION.
APTIC-25871 03

RESULTS OBTAINED WITH A NEW METHOD OF DETERMINATION OF THE PARTICLE-SIZE DISTRIBUTION OF SUSPENDED DUST.
APTIC-25872 03

THE DESIGN AND CONSTRUCTION OF A PHOTOELECTRONIC SCANNING MACHINE FOR SIZING MICROSCOPIC PARTICLES.
APTIC-25943 03

MEASUREMENT OF PARTICLE-SIZE DISTRIBUTION IN CLOUDS AND FOGS.
APTIC-25955 03

A NEW ROAD TO ACCELERATED GRAIN-SIZE ANALYSIS IN THE RANGE FROM 10 MICRON TO 0.1 MICRON IN DIAMETER.
APTIC-26060 03

REPRESENTATION OF PARTICLE-SIZE DISTRIBUTIONS BY MEANS OF A SIMPLE SPECTROMETER AS AN ACCESSORY TO SCATTERED LIGHT MEASURING DEVICES.
APTIC-26062 03

THEORY OF PARTICLE SIZING AND COUNTING BY TRACK SCANNING.
APTIC-26097 03

STUDIES ON DROPLET SIZE SPRAYED FROM HOLLOW CONE NOZZLES.
APTIC-26194 06

PARTICLE-SIZE SPECTROMETRY OF AEROSOLS BY LIGHT SCATTERING IN A LASER BEAM AND ITS APPLICATION TO AIR MONITORING AND FILTER TESTING.
APTIC-26214 03

A PHOTOELECTRIC METHOD OF INVESTIGATING THE DISTRIBUTION OF PARTICLE SIZE OF PRECIPITATION.
APTIC-26263 03

THE CASCADE CENTRIPETER FOR THE PARTICLE SIZE DETERMINATION AND ITS APPLICATION TO THE CHEMICAL ANALYSIS BY THE RING OVEN.
APTIC-26292 03

PARTICLE TRAJECTORIES

PARTICLE TRAJECTORIES AND CAPTURE OF PARTICLES BY A SPHERE.
APTIC-25827 06

PARTICULATE SAMPLING

MEASURING METHODS FOR THE QUANTITATIVE MEASUREMENT OF SOLID PARTICLES IN FLUE GASES.
APTIC-24579 03

ON MEASURING DUST SUSPENDED IN THE ATMOSPHERE - MAINLY ON THE RECENT AND MOST FREQUENTLY USED INSTRUMENTS.
APTIC-26047 03

PARTICULATES

MEASURING METHODS FOR THE QUANTITATIVE MEASUREMENT OF SOLID PARTICLES IN FLUE GASES.
APTIC-24579 03

A COMPARISON OF NAPCA AND IIA SOURCE SAMPLING METHODS.
APTIC-24582 03

METHOD AND EQUIPMENT FOR MAKING PREPARATIONS OF MICROSCOPIC PARTICLES OF SOLID SUBSTANCES.
APTIC-24598 03

ONTARIO'S AIR POLLUTION INDEX.
APTIC-24635 04

ENEMIES IN THE AIR.
APTIC-24920 02

SEDIMENTATION OF POWDERED SOLIDS.
APTIC-24973 06

FORMATION OF PARTICLES OF PHOTOLYTIC ORIGIN IN AIR.
APTIC-25564 05

THE APPLICATION OF AIR SAMPLING IN THE EVALUATION AND CONTROL OF THE OCCUPATIONAL ENVIRONMENT.
APTIC-25608 03

RISE AND GROWTH OF SPACE VEHICLE ENGINE EXHAUST AND ASSOCIATED DIFFUSION MODELS.
APTIC-25685 05

EXHAUST GAS WASHING APPARATUS.
APTIC-25715 02

APPARATUS FOR CONTROL OF AIR POLLUTION.
APTIC-25910 02

LOW VOLUME AIR SAMPLER RESEARCH ON THE MEASUREMENT OF THE PARTICULATES IN THE AIR WITH LOW VOLUME AIR SAMPLER.
APTIC-26007 03

PROBLEMS ON MEASUREMENT OF THE CONCENTRATION OF PARTICULATE CONTAMINANTS IN SMOKE DUST.
APTIC-26020 03

POWER AND INDUSTRY PARTICULATES.
APTIC-26233 02

PATHOLOGICAL TECHNIQUES

A DEVICE FOR THE PROLONGED AND REPEATED EXPOSURE OF ANIMALS TO CARBON MONOXIDE. (CHRONIC CARBON MONOXIDE POISONING SERIES II).
APTIC-26236 07

PENNSYLVANIA

URBAN-RURAL DIFFERENCES IN LUNG CANCER MORTALITY RATES IN THE STATE.
APTIC-25849 07

PERMEABILITY

WATER PERMEABILITY OF RUST LAYER FORMED BY ATMOSPHERIC CORROSION.
APTIC-24671 09

PEROXYACETYL NITRATE

PEROXYACYL NITRATES.
APTIC-25982 05

THE FORMATION, REACTIONS, AND PROPERTIES OF PEROXYACYL NITRATES (PANS) IN PHOTOCHEMICAL AIR POLLUTION.
APTIC-26235 05

PERYLENES

ANALYSIS OF POLYCYCLIC HYDROCARBONS IN PARTICULATE POLLUTANTS.
APTIC-25920 03

PESTICIDES

SEVERAL TYPES OF SIDE-EFFECTS.
APTIC-24667 08

SPECTROCOLORIMETRIC DETERMINATION OF HEXACHLOROCYCLOHEXANE IN THE ATMOSPHERE.
APTIC-24975 03

INDUSTRIAL ENVIRONMENT CHEMICALS, OCCURRENCE, DECOMPOSITION AND CONSEQUENCES.
APTIC-25859 01

AIR POLLUTION CAUSED BY AGRICULTURE AND FORESTRY PESTICIDES.
APTIC-26093 01

PETER SPENCE PROCESS (CLAUS)

RECOVERING ELEMENTAL SULFUR FROM WATERS CONTAINING HYDROGEN SULFIDE.
APTIC-25884 02

PETROLEUM PRODUCTION

OIL'S U. S. ANITPOLLUTION OUTLAY SURGING.
APTIC-24841 02

PETROLEUM REFINING

LOADING FACILITIES.
APTIC-24601 01

TURNAROUNDS, EQUIPMENT MAINTENANCE, AND BLOWDOWN SYSTEMS.
APTIC-24602 01

BLIND CHANGING.
APTIC-24721 01

AIR BLOWING.
APTIC-24723 01

RECOVERY OF REFINERY SULFUR IN AIR-POLLUTION CONTROL.
APTIC-24792 02

EBULLATED (SIC) BED H-OIL METHOD.
APTIC-26006 02

PRODUCTION AND COST OF LEADLESS GASOLINE.
APTIC-26021 02

DESULFURIZATION PROCESS IN WHOLE INDUSTRIES (II).
APTIC-26124 02

PHENOLS

EXPERIMENTAL CARCINOGENESIS OF THE LUNG. II. INFLUENCE OF PHENOLS IN THE PRODUCTION OF CARCINOMA.
APTIC-24633 07

PHEOPHYTIN

ORIGINAL TREATISES CONCERNING THE USABILITY OF THE

SPECTROSCOPIC PHAOPHYTIN-TEST IN SMOKE-DAMAGE DIAGNOSIS.
APTIC-24851 08

PHILADELPHIA
CONTINUOUS AIR MONITORING PROJECTS 1968 DATA TABULATIONS AND SUMMARIES, PHILADELPHIA.
APTIC-25804 04

PHOSPHATES
FLUORIDE RECOVERY FROM PHOSPHORUS PRODUCTION.
APTIC-24834 02

STUDIES ON THE REMOVAL OF SULFUR DIOXIDE FROM HOT FLUE GASES AS A MEASURE TO PREVENT AIR POLLUTION IV. RECOVERY OF FLUE GAS SULFUR AS AMMONIUM PHOSPHATE.
APTIC-24844 02

PHOSPHORESCENCE
AN EXPRESS DETERMINATION OF OZONE CONCENTRATION IN THE AIR.
APTIC-24691 03

THE USE OF SILOXENE FOR DETERMINING SMALL AMOUNTS OF NITROGEN DIOXIDE.
APTIC-24839 03

FLUORESCENCE AND PHOSPHORESCENCE OF SO2 VAPOR.
APTIC-24894 06

THE DECAY MECHANISM OF TRIPLET SULFUR DIOXIDE MOLECULES FORMED BY INTERSYSTEM CROSSING IN THE FLASH PHOTOLYSIS OF SO2 (2400-3200 A).
APTIC-26154 06

PHOSPHORUS COMPOUNDS
AIR POLLUTION FROM FLUORIDES.
APTIC-26258 01

PHOTOCHEMICAL REACTIONS
DESIGN OF A FACILITY (SMOG CHAMBER) FOR STUDYING PHOTOCHEMICAL REACTIONS UNDER SIMULATED TROPOSPHERIC CONDITIONS.
APTIC-24659 03

THE PRODUCTION OF NUCLEI BY PHOTOCHEMICAL DECOMPOSITIONS OF HYDROGEN SULFIDE.
APTIC-24779 05

SINGLET MOLECULAR OXYGEN AND THE PHOTOCHEMISTRY OF URBAN ATMOSPHERES.
APTIC-24825 05

SIMULATION OF PHOTOCHEMICAL REACTION IN POLLUTED AIR.
APTIC-25887 05

CHEMICAL PROBLEMS IN AIR POLLUTION.
APTIC-26198 05

METEOROLOGICAL ASPECTS OF AIR POLLUTION AND SIMULATION MODELS OF DIFFUSION, TRANSPORT AND REACTIONS OF AIR POLLUTION TASK FORCE ASSESSMENT.
APTIC-26222 05

EFFECTS OF PHOTOCHEMICAL POLLUTANTS ON THE RESPIRATORY TRACT.
APTIC-26227 07

PHOTOGRAPHIC METHODS
OZONE ABSORPTION COEFFICIENTS IN THE VISIBLE AND ULTRAVIOLET REGIONS.
APTIC-24701 06

AIR POLLUTION RESEARCH.
APTIC-26218 03

PHOTOLYSIS
PRIMARY PHOTOCHEMICAL PROCESSES IN THE 3660 A PHOTOLYSIS OF 5',7'-DICHLORO-6'-NITRO-1,3,3-TRIMETHYL-INDOLINO-BENZOPYRYLOSPIRAN(I) IN ACETONITRILE.
APTIC-24042 06

NATURAL SOURCES OF GASEOUS POLLUTANTS IN THE ATMOSPHERE.
APTIC-24615 05

AEROSOL FORMATION FROM GASEOUS AIR POLLUTANTS.
APTIC-24921 05

FORMATION OF PARTICLES OF PHOTOLYTIC ORIGIN IN AIR.
APTIC-25564 05

ON THE STABILITY OF ACROLEIN TOWARDS PHOTO-OXIDATION IN THE NEAR ULTRAVIOLET.
APTIC-25630 05

TERMINAL PROGRESS REPORT ON PUBLIC HEALTH SERVICE RESEARCH GRANT AP00349, 1/1/64 TO 12/31/68.
APTIC-25636 06

OXIDATION OF ETHYLENE BY THE PHOTOLYSIS OF NO2 AT 25 C.
APTIC-25981 06

THE DECAY MECHANISM OF TRIPLET SULFUR DIOXIDE MOLECULES FORMED BY INTERSYSTEM CROSSING IN THE FLASH PHOTOLYSIS OF SO2 (2400-3200 A).
APTIC-26154 06

REACTIONS IN THE ATMOSPHERE.
APTIC-26229 05

PHOTOMETRIC METHODS
THE WAVELENGTH DEPENDENCE OF ATMOSPHERIC EXTINCTION.
APTIC-24658 05

MEASUREMENT OF AVERAGE PARTICLE SIZE IN AEROSOLS BY LIGHT SCATTERING.
APTIC-24791 03

NEW METHOD OF LIGHT MODULATION FOR DUAL-BEAM PHOTOMETERS AND SPECTROPHOTOMETERS.
APTIC-24897 03

STUDY OF ATMOSPHERIC AND AAP OBJECTIVES OF CROSS-BEAM EXPERIMENTS. (FINAL REPORT).
APTIC-24924 03

DETERMINATION OF POLLUTANTS IN INDUSTRY WITH THE USE OF MINE INTERFEROMETER.
APTIC-24938 03

IMPROVEMENTS IN OR RELATING TO DUST TRAPS FOR USE IN THE EXAMINATION OF DUST-LADEN GAS.
APTIC-25664 03

A SCATTERED LIGHT MEASURING DEVICE FOR HIGH CONCENTRATIONS OF DUST.
APTIC-25870 03

METHOD AND APPARATUS FOR DETERMINING THE PRESENCE OF VAPOR IN A GAS.
APTIC-25912 03

THE DESIGN AND CONSTRUCTION OF A PHOTOELECTRONIC SCANNING MACHINE FOR SIZING MICROSCOPIC PARTICLES.
APTIC-25943 03

MEASUREMENT OF PARTICLE-SIZE DISTRIBUTION IN CLOUDS AND FOGS.
APTIC-25955 03

THEORY OF PARTICLE SIZING AND COUNTING BY TRACK SCANNING.
APTIC-26097 03

A PHOTOELECTRIC METHOD OF INVESTIGATING THE DISTRIBUTION OF PARTICLE SIZE OF PRECIPITATION.
APTIC-26263 03

PHOTOOXIDATION
HYDROCARBON REACTIVITIES IN THE ATMOSPHERIC PHOTOOXIDATION OF NITRIC OXIDE.
APTIC-24660 05

INHIBITION OF ATMOSPHERIC PHOTOOXIDATION OF HYDROCARBONS BY NITRIC OXIDE.
APTIC-24946 05

RATE CONSTANTS FOR ATMOSPHERIC REACTIONS.
APTIC-26234 05

PHOTOSYNTHESIS
THE PROBLEM OF CEMENT FACTORY DUST FROM THE AGRICULTURAL STANDPOINT.
APTIC-25964 08

PILOT PLANTS
NEW WAY TO DESULFURIZE RESIDS.
APTIC-24830 02

COAL CLEANING PLANT PROTOTYPE SPECIFICATIONS A REPORT TO PROCESS CONTROL ENGINEERING DIVISION NATIONAL AIR POLLUTION CONTROL ADMINISTRATION.
APTIC-25820 02

PILOT-PLANT INVESTIGATIONS OF THE DESULPHURISATION OF LIGHT DISTILLATES.
APTIC-25962 02

GULF METHOD.
APTIC-26066 02

PLANNING AND ZONING
REPORT FOR CONSULTATION ON THE METROPOLITAN PROVIDENCE INTERSTATE AIR QUALITY CONTROL REGION (RHODE ISLAND-MASSACHUSETTS).
APTIC-12569 12

THE IMPORTANCE OF PROTECTIVE PLANTINGS AGAINST AIR POLLUTANTS.
APTIC-24730 02

URBAN PLANNING ASPECTS OF AIR POLLUTION ABATEMENT.
APTIC-26157 12

THE ROLE OF THE WINDS WITH SOUTHERN COMPONENT IN THE AIR POLLUTION.
APTIC-26294 05

PLANS AND PROGRAMS
INITIATIVE FOR WATER AND AIR POLLUTION CONTROL.
APTIC-24683 02

PROTECTION AGAINST IMMISSION.
APTIC-25638 02

THE HUNDRED MEASURES.
APTIC-25731 12

TVA AIR POLLUTION STUDIES PROGRAM.
APTIC-25815 05

PROPOSED IMPLEMENTATION PLAN FOR THE CONTROL OF PARTICULATES AND SULFUR OXIDES FOR THE STATE OF INDIANA PORTION OF THE METROPOLITAN CINCINNATI INTERSTATE AIR QUALITY CONTROL REGION.

APTIC-25998 12

HEALTH EFFECTS RESEARCH PROGRAM OF THE NATIONAL AIR
POLLUTION CONTROL ADMINISTRATION.
APTIC-26213 12

PLANT DAMAGE
REACTION OF TREES AND SHRUBBERY TO AIR POLLUTION IN THE
FOREST-PARK BELT OF MOSCOW AND MEASURES FOR EXTENDING THE
LIFESPAN OF PLANTS.
APTIC-24733 08

SOME DATA ON THE WATER BALANCE IN PLANTS IN THE PRESENCE OF
FLUOR IN THE SUBSTRATE.
APTIC-24787 08

EXPERIMENTAL STUDY OF THE EFFECT OF NITROGEN DIOXIDE ON
PLANTS.
APTIC-24808 08

ORIGINAL TREATISES CONCERNING THE USABILITY OF THE
SPECTROSCOPIC PHAOPHYTIN-TEST IN SMOKE-DAMAGE DIAGNOSIS.
APTIC-24851 08

SOME PECULIARITIES OF THE SUSCEPTIBILITY OF SCOTCH PINE TO
SULFUR DIOXIDE INJURY.
APTIC-24853 08

THE EFFECT OF INDUSTRIAL GASES AND INDUSTRIAL SMOKE ON
VARIOUS FOREST SPECIES.
APTIC-24866 08

CURRENT CONDITIONS AND SCIENTIFIC PROBLEMS IN STUDYING THE
INJURIOUS EFFECTS OF INDUSTRIAL POLLUTANTS ON PLANTS AND IN
DEVELOPING METHODS FOR CONTROLLING THEM IN THE URALS.
APTIC-24867 08

INFORMATION ON DAMAGE CAUSED BY AIR POLLUTION TO THE PLANTS
AND ANIMALS IN EUROPEAN COUNTRIES.
APTIC-24933 08

THE INFLUENCE OF FLUORINE EXHALATION ON THE FLORA IN THE
SURROUNDINGS OF AN ALUMINUM PLANT.
APTIC-25661 08

DAMAGE CAUSED DUE TO FOUNDRY SMOKE.
APTIC-25750 08

AIR POLLUTION AND SOUTHERN FORESTS.
APTIC-25769 08

HYDROCHLORIC ACID. BROMINE. IODINE. HYDROGENCYANIDE.
ETHYLENE. CARBONMONOXIDE. MERCAPTANS. COAL GAS. ASPHALT-
AND TAR-VAPORS. SATURATED HYDROCARBONS. ACETIC ACID. 2,4-
DICHLORO-PHENOXY-ACETIC ACID. MERCURY. SELENIUM. SMOKE
AND FOG.
APTIC-25826 08

WHAT AIR POLLUTION DOES TO YOUR PLANTS.
APTIC-25865 08

SENSITIVITY OF GRAPEVINES TO INJURY BY ATMOSPHERIC SULFUR
DIOXIDE.
APTIC-25888 08

THE STUDY OF DAMAGES CAUSED BY AIR POLLUTION TO LIVE PLANTS
AND PLANT COMMUNITIES.
APTIC-25927 08

MAN AND AIR -- THREATS TO PRAIRIE SURVIVAL.
APTIC-26055 08

INVESTIGATION ON INJURY TO PLANTS FROM AIR POLLUTION IN THE
LOS ANGELES AREA.
APTIC-26146 08

EFFECTS OF AIR POLLUTANTS ON AGRICULTURE AND FORESTRY
PLANTS.
APTIC-26158 08

IMPLICATIONS OF AIR POLLUTION FOR PLANT LIFE.
APTIC-26219 08

PLANT GROWTH
CHARACTERISTICS OF PHOTOSYNTHESIS AND OF SOME OTHER
PROCESSES IN CONNECTION WITH SMOKE AND GAS RESISTANCE OF
TREES AND SHRUBS.
APTIC-24593 08

PLANT GROWTH AND LABORATORY ATMOSPHERE.
APTIC-24773 08

THE EFFECT OF SPECIFIC INDUSTRIAL GASES ON THE GROWTH OF
SOME TREE SPECIES.
APTIC-24864 08

CYTOGENIC EFFECTS OF FLUORIDE TECHNICAL PROGRESS REPORT.
APTIC-25618 08

BIOCHEMICAL PHENOMENA IN THE SOIL IN EXHALATION AREAS.
APTIC-25660 08

PLANT INDICATORS
MEASUREMENT OF ATMOSPHERIC FLUORINE. ANALYSES OF RAIN WATERS
AND SPANISH MOSS EXPOSURES.
APTIC-24717 08

BIOLOGICAL SYSTEMS FOR THE IDENTIFICATION AND DISTRIBUTION
OF AIR POLLUTANTS.
APTIC-24766 08

LICHENS AS AN INDICATOR OF AIR POLLUTION.
APTIC-25655 08

INVESTIGATION ON INJURY TO PLANTS FROM AIR POLLUTION IN THE
LOS ANGELES AREA.
APTIC-26146 08

PLANTS (BOTANY)
THE BIOSYNTHESIS OF STERYL GLUCOSIDES IN PLANTS.
APTIC-24661 08

POLLUTION OF CULTIVATED PLANTS WITH LEAD FROM AUTO EXHAUST.
APTIC-24788 08

THE EFFECT OF PLANTS OF A COMBINATION OF SUBACUTE AND TOXIC
SULFUR DIOXIDE DOSES.
APTIC-25662 08

THE CURRENT LEAD CONTENT IN VEGETATION GROWING IN THE
VICINITY OF SWISS HIGHWAYS.
APTIC-25878 08

INORGANIC FLUORIDES.
APTIC-25933 11

PLASTICS
TOXICOLOGIC ASPECTS OF FLAMMABILITY AND COMBUSTION OF
POLYMERIC MATERIALS.
APTIC-26153 07

REACTION OF SO2 WITH POLYMER.
APTIC-24742 09

PLATINUM
THE ROLE OF THE SAMPLE HOLDER IN THE THERMAL INVESTIGATION
OF PROCESSES ACCOMPANIED BY THE SPLITTING OFF OF CO.
APTIC-24653 06

PLETHYSMOGRAPHY
BODYPLETHYSMOGRAPHY.
APTIC-24731 07

PLEURISY
ASBESTOS PLEURISY.
APTIC-25844 07

PLUME BEHAVIOR
ON INCREASED CHIMNEY HEIGHT.
APTIC-24585 05

TURBULENT BUOYANT JETS INTO STRATIFIED OR FLOWING AMBIENT
FLUIDS.
APTIC-24797 06

MODEL TESTS ON FLOW FROM A BUILDING VENTILATION STACK.
APTIC-24803 05

PLUME EFFECTS OF NATURAL DRAFT HYPERBOLIC COOLING TOWERS.
APTIC-24835 05

SYMPOSIUM ON THE DISPERSION OF CHIMNEY GASES. II.
APTIC-24869 05

RISE AND GROWTH OF SPACE VEHICLE ENGINE EXHAUST AND
ASSOCIATED DIFFUSION MODELS.
APTIC-25685 05

THE RISE OF BOUYANT CLOUDS.
APTIC-25819 05

TRANSVERSE JET PLUME. (TECHNICAL PROGRESS REPORT).
APTIC-25831 05

DEFLECTION OF A JET INJECTED INTO A STREAM.
APTIC-25942 05

THE LONG RANGE DIFFUSION OF THE EFFLUENT CLOUD FROM THE
PHOEBUS 1B EP-IV REACTOR TEST OF FEBRUARY 23, 1967.
APTIC-26192 05

AIR POLLUTION RESEARCH.
APTIC-26210 03

EFFECT OF DILUTING STACK GASES ON DOWNWIND CONCENTRATION.
APTIC-26261 05

THE DIFFUSION OF SMOKE GASES FROM FACTORY CHIMNEYS AND ITS
METEOROLOGICAL CONDITIONS.
APTIC-26267 05

PNEUMOCONIOSIS
PROPOSAL FOR A UNIFORM EVALUATION OF THE DANGER OF
PNEUMOCONIOSIS.
APTIC-24649 07

A HEALTH-SOCIOLOGICAL STUDY ON PNEUMOCONIOSIS IN A COPPER
MINE AFTER THE ENFORCEMENT OF THE PNEUMOCONIOSIS LAW.
APTIC-25722 07

PNEUMONIA
PNEUMONIA IN THE AREA OF THE SAUDA FACTORIES OF RYFLYKE.
APTIC-24586 07

POINT SOURCES
THE DEPOSITION OF DUST PARTICLES FROM ELEVATED SOURCES.
APTIC-25648 05

POLAND
THE DEATH RATE DUE TO LUNG CANCER IN PEOPLE LIVING IN
SELECTED TOWNS IN POLAND IN THE POLLUTION OF THE ATMOSPHERE.
APTIC-24935 07

POLAROGRAPHIC METHODS
ALTERNATING CURRENT POLAROGRAPHIC ANALYSIS OF LEAD IN
AUTOMOBILE EXHAUST GAS.
APTIC-24617 03

POLLENS
STATISTICAL REPORT OF AEROALLERGENS (POLLENS AND MOLDS) FORT
HUACHUCA, ARIZONA 1969.
APTIC-25679 04

DETECTION OF POLLEN FLAVONOIDS BY FLUORESCENCE ON
IMPREGNATED PAPERS.
APTIC-25928 03

POLLUTANTS
REFERENCE BOOK SUMMARY OF NATIONWIDE EMISSIONS.
APTIC-12496 01

EFFECT OF ATMOSPHERIC CONTAMINANTS ON LIGHTFASTNESS TESTING.
APTIC-24906 09

REVIEW OF TENTATIVE ABORT, ALERT, 100 AND 1000-DAY LIMITS
FOR SPACE CABIN CONTAMINANTS.
APTIC-24957 11

EFFECTS OF AIR POLLUTION ON ANIMALS EXPOSED TO STREET
ATMOSPHERES IN DETROIT.
APTIC-24964 07

REGARDING THE EFFECT OF PHYSICOGEOGRAPHIC CONDITIONS ON THE
CONCENTRATION OF INDUSTRIAL EMISSIONS INTO THE ATMOSPHERE.
APTIC-25813 05

PHYSIOLOGIC PROCESSES IN ABSORPTION OF POLLUTANTS.
APTIC-25988 07

STUDIES ON MASS EXAMINATION BY INTRADERMAL REACTION AGAINST
HOUSE DUST EXTRACT AMONG SCHOOL CHILDREN IN THE AIR POLLUTED
AND UNPOLLUTED AREA. REPORT II. RELATIONS BETWEEN THE
INTRADERMAL REACTION AND INFLUENCES OF AIR POLLUTION ON THE
HUMAN BODY.
APTIC-26004 07

THE INFLUENCE OF AIR POLLUTION. 3.1. THE INFLUENCE OF AIR
POLLUTION ON TREES. 2. THE CHARACTERISTICS OF INSOLUBLE
SUBSTANCES ADHERED TO THE LEAVES OF ROADSIDE TREES.
APTIC-26035 08

MEASUREMENT OF GASEOUS AIR POLLUTION.
APTIC-26122 03

SOPHISTICATED SYSTEMS REQUIRED TO MONITOR HEAVIER POLLUTION.
APTIC-26256 03

POLLUTION PRECURSORS
COLLISION RATES BETWEEN GAS MOLECULES AND AEROSOL PARTICLES.
APTIC-26228 05

POLYMERS
THE EFFECT OF AIR POLLUTANTS ON POLYMERS.
APTIC-25680 09

POLYNUCLEAR COMPOUNDS
CARCINOGENIC HYDROCARBONS AND RELATED COMPOUNDS IN PROCESSED
RUBBER.
APTIC-24629 01

APTIC-24629 01

STUDY OF THE ATMOSPHERIC POLYCYCLIC HYDROCARBONS. I.
PROBLEMS CONNECTED WITH THE COUPLING OF THIN-LAYER
CHROMATOGRAPHY AND GAS CHROMATOGRAPHY.
APTIC-24705 03

EFFECT OF THE FEBRUARY 1959 FOGS ON THE POLYCYCLIC
HYDROCARBON CONCENTRATION OF THE ATMOSPHERE OF THE LIEGE
AREA.
APTIC-24923 04

THE DEATH RATE DUE TO LUNG CANCER IN PEOPLE LIVING IN
SELECTED TOWNS IN POLAND IN THE POLLUTION OF THE ATMOSPHERE.
APTIC-24935 07

A DOUBLE BRADSHER REACTION.
APTIC-25659 06

POLYNUCLEAR AROMATIC HYDROCARBON COMPOSITION OF THE
ATMOSPHERE IN SOME LARGE AMERICAN CITIES.
APTIC-25693 04

FOOD IN A CARCINOGENIC ENVIRONMENT.
APTIC-25704 07

ANALYSIS OF POLYCYCLIC HYDROCARBONS IN PARTICULATE
POLLUTANTS.
APTIC-25920 03

CARCINOGENIC HAZARDS OF AROMATIC POLYCYCLIC HYDROCARBONS IN
THE POLLUTED ATMOSPHERE.
APTIC-26206 07

POLYVINYL CHLORIDE
DISPOSAL OF FUMES FROM PVC DURING COPPER RECOVERY.
APTIC-24019 02

PORCELAIN ENAMEL FRITS
SPECTROCHEMICAL DETERMINATION OF FLUORINE IN PORCELAIN
ENAMEL FRITS.
APTIC-26209 03

POROSITY
APPLICATION OF MERCURY-INTRUSION METHOD FOR DETERMINATION OF
PORE-SIZE DISTRIBUTION TO MEMBRANE FILTERS.
APTIC-24856 02

PORTABLE
THE CONDENSATION NUCLEI COUNTER AS AN AIR POLLUTION WEAPON.
APTIC-24634 03

POTASSIUM COMPOUNDS
LEASE-GAS SWEETENING. PART 6. HOT CARBONATE--ANOTHER
POSSIBILITY.
APTIC-24871 02

PRELIMINARY EVALUATION OF CEMENT DUST FROM ELECTROFILTERS AS
A POTASSIUM FERTILIZER.
APTIC-25609 02

POTENTIOMETRIC METHODS
GALVANIC APPARATUS FOR THE STUDY OF GASES. II. CONTINUOUS
DETERMINATION OF SMALL AMOUNTS OF CHLORINE IN GASES.
APTIC-24863 03

STUDIES ON THE ANALYSIS OF HYDROCARBONS FROM INCINERATOR
EFFLUENTS WITH A COMBUSTIBLE GAS INDICATOR.
APTIC-25696 03

A NEW DEVICE FOR CONTINUOUS DETERMINATION OF SULFUR DIOXIDE.
APTIC-26120 03

IMPROVEMENTS RELATING TO METHODS OF AND INSTRUMENTS FOR
MEASURING THE CONCENTRATION OF COMBUSTIBLE GAS IN AN AIR
SAMPLE.
APTIC-26245 03

POULTRY
FATTY ACID ANALYSIS OF CEREBROSPINAL FLUID OF CHICKEN.
APTIC-12616 06

POWER SOURCES
SPECIAL FEATURES OF THE 140 MW TURBINE OF THE DUISBURG POWER
PLANT.
APTIC-26237 01

PRECIPITATION
CALCULATION OF PRECIPITATION SCAVENGING OF PARTICULATES AND
GASES FROM THE ATMOSPHERE.
APTIC-25951 05

A PHOTOELECTRIC METHOD OF INVESTIGATING THE DISTRIBUTION OF
PARTICLE SIZE OF PRECIPITATION.
APTIC-26263 03

PRESSURE
SAMPLE HANDLING SYSTEM FOR AUTO EXHAUST ANALYZER.
APTIC-25732 03

PRIMARY METALLURGICAL PROCESSING
SYSTEMS STUDY FOR CONTROL OF EMISSIONS. PRIMARY NONFERROUS
SMELTING INDUSTRY. (FINAL REPORT). VOLUME II APPENDICES
A AND B.
APTIC-12751 02

SYSTEMS STUDY FOR CONTROL OF EMISSIONS. PRIMARY NONFERROUS
SMELTING INDUSTRY. (FINAL REPORT). VOLUME III APPENDICES
C THROUGH G.
APTIC-12777 02

SYSTEMS STUDY FOR CONTROL OF EMISSIONS. PRIMARY NONFERROUS
SMELTING INDUSTRY. (FINAL REPORT). VOL I.
APTIC-12823 02

PNEUMONIA IN THE AREA OF THE SAUDA FACTORIES OF RYFLYKE.
APTIC-24506 07

THE FELD SCRUBBER FOR CLEANING METALLURGICAL SMOKE.
APTIC-24724 02

FINE FILTRATION OF PROCESS AND WASTE GASES FROM LEAD
PRODUCTION WITH THE AID OF JET BLAST BAG FILTERS.
APTIC-24771 02

SMOG CONTROL HELPS BAG MORE PROFITS.
APTIC-24782 02

APTIC-24782 02

SULFUR IN IRON- AND STEELMAKING.
APTIC-24928 01

TESTING PROCEDURES AND EQUIPMENT.
APTIC-24960 03

METALLURGICAL SMOKE.
APTIC-25605 02

MODERN AUTOMATIC BAGHOUSES FOR COLLECTION OF LEAD-FURNACE
FUMES.
APTIC-25781 02

SMELTERY FUMES--THEIR CONDENSATION AND UTILIZATION.
APTIC-25969 02

TREATMENT OF DUST GENERATED AT IRON MILL.
APTIC-26003 02

REPORT OF THE SURVEY OF AIR POLLUTION OF ANNAKA AREA IN
GUNMA PREFECTURE.
APTIC-26054 04

TECHNOLOGY OF POLLUTION-CONTROL IN ZINC AND LEAD SMELTING.

APTIC-26107 01

PRESENT SITUATION AND OUTLOOK OF FLUORIDES AIR POLLUTION PREVENTION TECHNOLOGY--TACKLING WITH ALUMINUM SMELTING POLLUTION.
APTIC-26136 01

AIR POLLUTION FURNACE TYPES AND SIZES DICTATE MOST EFFECTIVE CONTROLS. PART I.
APTIC-26166 02

A BRIEF REVIEW OF FLUE GAS TREATMENT.
APTIC-26195 02

PROCESS MODIFICATION
TACKLING THE PROBLEM OF NITROGEN OXIDES.
APTIC-24922 02

ELIMINATION OF POLLUTION CAUSED BY FOUNDRY WORKS.
APTIC-26058 02

PRODUCTION
THE WORLD SUPPLY OF SULFUR.
APTIC-24917 10

PROPAGATION VELOCITY
PROPAGATION VELOCITY AND FLAME SPREAD THROUGH SIMULATED FUEL BEDS.
APTIC-25989 06

PROPANES
EXHAUST EMISSIONS FROM SEVEN LP GAS POWERED VEHICLES.
APTIC-25678 02

PROPIONALDEHYDES
THE OXOSYNTHESIS OF PROPIONIC ALDEHYDE IN A THIN LAYER REACTOR.
APTIC-25830 06

PROPOSALS
AUTOMOTIVE POLLUTION CONTROL.
APTIC-23390 12

LEAD AND AIR POLLUTION AN ANALYSIS OF THE HORSE REPORT.
APTIC-24877 01

PROPOSED IMPLEMENTATION PLAN FOR THE CONTROL OF PARTICULATES AND SULFUR OXIDES FOR THE STATE OF OHIO PORTION OF THE METROPOLITAN CINCINNATI INTERSTATE AIR QUALITY CONTROL REGION.
APTIC-25688 12

PARKERSBURG, WEST VIRGINIA--MARIETTA, OHIO, AIR POLLUTION ABATEMENT ACTIVITY SUPPLEMENTAL TECHNICAL REPORT.
APTIC-25780 04

PROTECTIVE MASKS
A METHOD FOR TESTING HIGH EFFICIENCY MECHANICAL FILTERS FOR THE SEPARATION OF RADIOACTIVE AEROSOLS AND FOR PERSONAL PROTECTION.
APTIC-24967 02

PROTEINS
EFFECTS OF CERTAIN CHEMICAL SUBSTANCES ON PROTEIN CONTENT OF BLOOD SERUM AND OF BONE MARROW.
APTIC-25738 07

PUBLIC AFFAIRS
PROBING THE LAW AND BEYOND A QUEST FOR PUBLIC PROTECTION FROM HAZARDOUS PRODUCT CATASTROPHES.
APTIC-24760 12

AIR POLLUTION A SOCIOLOGICAL PERSPECTIVE.
APTIC-25983 13

PUBLIC INFORMATION
BESANCON.
APTIC-26225 13

PULMONARY EDEMA
STOMACH CANCER AND AIR POLLUTION AN EXPERIMENTAL STUDY IN A PETROCHEMICAL AREA.
APTIC-26250 07

PULMONARY FUNCTION
PLEURAL SURFACE PRESSURE IN DOGS.
APTIC-24664 07

DETERMINATION OF THE COEFFICIENT OF THE VITALLY NECESSARY VOLUME OF THE LUNGS OF CHILDREN.
APTIC-24690 07

EFFECTS ON CANINE PULMONARY FUNCTION VIA INDUCED NO2 IMPAIRMENT, PARTICULATE INTERACTION, AND SUBSEQUENT SOX.
APTIC-24980 07

EFFECTS OF AIR POLLUTION ON SCHOOL ABSENCES AND DIFFERENCES IN LUNG FUNCTION IN FIRST AND SECOND GRADERS IN BERLIN, NEW HAMPSHIRE, JANUARY 1966 TO JUNE 1967.
APTIC-25563 07

STATE OF THE ART.
APTIC-26000 07

EFFECT OF AIR POLLUTION ON THE INHABITANTS IN OMUTA WITH SPECIAL REFERENCE TO THE FINDINGS OF LUNG FUNCTION AND CHEST X-RAY FILM.
APTIC-26024 07

PREVALENCE OF RESPIRATORY SYMPTOMS AND PEAK FLOW RATE OF THREE YEAR OLD CHILDREN.
APTIC-26089 07

THE STATISTICAL SURVEY ON UPPER RESPIRATORY REGION OF SCHOOLCHILDREN IN THE AIR POLLUTION AREA IN WAKAYAMA.
APTIC-26114 07

PULMONARY RESISTANCE
BODYPLETHYSMOGRAPHY.
APTIC-24731 07

FINDINGS OF PFR ON SO2 HIGH SENSITIVE SCHOOL CHILDREN.
APTIC-25740 07

AN EVALUATION OF THE ROLE OF NITROGEN DIOXIDE IN THE DEVELOPMENT OF RESPIRATORY DISEASES IN MAN.
APTIC-25987 07

PULVERIZED FUELS
EFFICIENCY OF ELECTROSTATIC PRECIPITATORS AS AFFECTED BY THE PROPERTIES AND COMBUSTION OF COAL.
APTIC-25786 02

PYRIDINES
REACTION OF NITROGEN OXIDES WITH BIOLOGICALLY IMPORTANT AMINES.
APTIC-25580 06

PYROLYSIS
QUALITATIVE ANALYSES OF ODOR COMPONENTS IN THE PYROLYSIS OF FEATHER IN THE LABORATORY TEST.
APTIC-26014 02

PYRROLE
COMPLEX FORMATION OF IMIDAZOLE AND PYRROLE IN AQUEOUS PHASE AND PREFERENTIAL FIXATION OF 3,4-BENZOPYRENE BY THE MEDIUM.
APTIC-25746 06

QUINONES
PROCEDURE FOR EXTRACTING AND CONCENTRATING SULFUROUS GASES.
APTIC-24778 02

RADIATION MEASURING SYSTEMS
DAYTIME TRACKING OF A HIGH-ALTITUDE VAPOR TRAIL.
APTIC-23591 03

AEROSOL PREPARATION, GENERATION, AND ASSESSMENT. PROJECT HARE.
APTIC-25760 03

RADIO FREQUENCY
RADIO FREQUENCY GAS CHROMATOGRAPHIC DETECTORS.
APTIC-24765 03

RADIOACTIVE RADIATION
OZONE SYNTHESIS FOR WATER TREATMENT BY HIGH ENERGY RADIATION.
APTIC-24041 06

AEROSOL STUDIES IN THE REACTOR SAFETY PROGRAM AT OAK RIDGE NATIONAL LABORATORY.
APTIC-24875 01

THE APPLICATION OF AIR SAMPLING IN THE EVALUATION AND CONTROL OF THE OCCUPATIONAL ENVIRONMENT.
APTIC-25608 03

DEVICE FOR SAMPLING AEROSOLS.
APTIC-25699 03

RADIATION SAFETY OF POWER REACTORS. PART I. ENVIRONMENTAL CONTAMINATION AND ITS EFFECTS TO THE PUBLIC.
APTIC-25914 01

PREPARATION OF RADIOACTIVE SULFUR DIOXIDE FROM BARIUM SULFATE.
APTIC-25929 06

USE OF ROUTINE METEOROLOGICAL OBSERVATIONS FOR ESTIMATING ATMOSPHERIC DISPERSION.
APTIC-25935 05

POWER CONTROL OF RADIOACTIVE EMISSIONS FROM NUCLEAR REACTORS.
APTIC-25975 01

RADIOACTIVE TRACERS
RADIOACTIVE COPPER AS AN ATMOSPHERIC TRACER.
APTIC-24914 03

THE ADDITION OF NATURAL RADIONUCLIDES TO AEROSOL PARTICLES AND PRECIPITATION ELEMENTS IN THE ATMOSPHERE.
APTIC-24976 05

AEROSOL PREPARATION, GENERATION, AND ASSESSMENT. PROJECT HARE.
APTIC-25760 03

PREPARATION OF RADIOACTIVELY LABELLED CONDENSATION AEROSOLS. I. AEROSOLS OF SODIUM CHLORIDE, SILVER IODIDE AND SULPHURIC ACID.
APTIC-25801 06

ON THE SIMULTANEOUS MEASUREMENTS OF THE PARTICLE SIZE DISTRIBUTION OF RADIOACTIVE CHARGED AEROSOLS AND CONCENTRATION RATIO OF POSITIVE TO NEGATIVE.
APTIC-25834 03

THE USE OF RADIOACTIVE TRACERS IN QUANTITATIVE STUDIES OF MOVEMENTS OF THE ATMOSPHERE.
APTIC-25842 05

RADIOGRAPHY
ON THE ROENTGENOLOGICAL DETECTABILITY OF DUST DEPOSITS IN THE LUNGS. STUDIES ON THE ALDERSON-RANDO PHANTOM.
APTIC-18289 06

PLEURAL CALCIFICATION AS A ROENTGENOLOGIC SIGN OF NON-OCCUPATIONAL ENDEMIC ANTHOPHYLLITE-ASBESTOSIS.
APTIC-22195 07

APPLICATION OF HETEROGENEITY EFFECTS ENCOUNTERED IN THE ABSORPTION AND EMISSION OF X-RAYS TO ON-STREAM SENSING OF VARIABLES SUCH AS PARTICLE SIZE.
APTIC-24600 03

EFFECT OF AIR POLLUTION ON THE INHABITANTS IN OMUTA WITH SPECIAL REFERENCE TO THE FINDINGS OF LUNG FUNCTION AND CHEST X-RAY FILM.
APTIC-26024 07

RAIN
MEASUREMENT OF ATMOSPHERIC FLUORINE. ANALYSES OF RAIN WATERS AND SPANISH MOSS EXPOSURES.
APTIC-24717 04

THE ADDITION OF NATURAL RADIONUCLIDES TO AEROSOL PARTICLES AND PRECIPITATION ELEMENTS IN THE ATMOSPHERE.
APTIC-24976 05

AN EXPERIMENTAL INVESTIGATION OF THE EFFECT OF AIR POLLUTION ON THE INITIATION OF RAIN.
APTIC-25639 05

PRECIPITATION CHARACTERISTICS   SHIPBOARD MEASUREMENTS IN THE CARIBBEAN SEA.
APTIC-26162 05

RAMAN SPECTROMETER
REMOTE RAMAN SPECTROSCOPY AS A POLLUTION RADAR.
APTIC-24637 03

REACTION KINETICS
CONJECTURE ON A CONNECTION BETWEEN LIFT AND PARTICLE DISPLACEMENT.
APTIC-24882 06

ADSORPTION OF HYDROCARBONS ON GRAPHITIZED CARBON.
APTIC-25621 02

THE FORMATION AND DECOMPOSITION REACTIONS OF THE ACETYL RADICAL AND THE HEAT OF FORMATION OF THE ACETYL RADICAL.
APTIC-25828 06

CELL AND SOLUTION VELOCITY CONSTANTS FOR THE REACTION CO & HB YIELDS COHB AT DIFFERENT TEMPERATURES IN MAMMALS WITH DIFFERENT RED CELL SIZES.
APTIC-25835 07

COLLISION RATES BETWEEN GAS MOLECULES AND AEROSOL PARTICLES.
APTIC-26228 05

REACTIONS IN THE ATMOSPHERE.
APTIC-26229 05

RATE CONSTANTS FOR ATMOSPHERIC REACTIONS.
APTIC-26234 05

REACTION MECHANISMS
NATURAL SOURCES OF GASEOUS POLLUTANTS IN THE ATMOSPHERE.
APTIC-24615 05

PRODUCTION AND DESTRUCTION MECHANISMS FOR O2 (1 DELTA G) IN THE LOWER ATMOSPHERE.
APTIC-24836 05

STUDIES OF THE MODE OF ACTION OF ASBESTOS AS A CARCINOGEN.
APTIC-24925 07

A DOUBLE BRADSHER REACTION.
APTIC-25659 06

THE REACTION OF ORGANIC ANIONS WITH CARBON MONOXIDE. (FINAL REPORT).
APTIC-25852 06

OXIDATION OF ETHYLENE BY THE PHOTOLYSIS OF NO2 AT 25 C.
APTIC-25941 06

PEROXYACYL NITRATES.
APTIC-25982 05

REACTORS (NUCLEAR)
MASS AND MOMENTUM EQUATIONS OF ISOTHERMAL NON-ISOBARIC GAS-LIQUID PHASE REACTIONS. III.
APTIC-12835 06

AEROSOL STUDIES IN THE REACTOR SAFETY PROGRAM AT OAK RIDGE NATIONAL LABORATORY.
APTIC-24875 01

RADIATION SAFETY OF POWER REACTORS. PART I. ENVIRONMENTAL CONTAMINATION AND ITS EFFECTS TO THE PUBLIC.
APTIC-25914 01

POWER   CONTROL OF RADIOACTIVE EMISSIONS FROM NUCLEAR REACTORS.
APTIC-25975 01

RECORDING METHODS
AIR POLLUTION MEASUREMENTS. DEVELOPMENTS IN AIR POLLUTION MEASUREMENT.
APTIC-24715 03

REDUCTION
PROCESS FOR RECOVERING ELEMENTAL SULFUR FROM GASES CONTAINING SULFUR DIOXIDE.
APTIC-24599 02

THERMODYNAMIC ANALYSIS OF THE REDUCTION OF SULFUR DIOXIDE BY METAL SULFIDES WITH THE FORMATION OF ELEMENTAL SULFUR.
APTIC-24703 06

PROCEDURE FOR RECOVERING ELEMENTAL SULFUR FROM SULFUROUS GASES.
APTIC-24777 02

ON THE INTERCELLULAR NITRATE IN THE LEAVES AND ROOTS OF BARLEY.
APTIC-24850 08

METHOD FOR CONVERTING HYDROGEN SULFIDE TO OBTAIN SULFUR.
APTIC-24908 02

PROCESS FOR MANUFACTURING SULFUR FROM SULFUR OXIDES, USING CARBON MONOXIDE.
APTIC-25649 02

METHOD FOR MANUFACTURING SULFUR.
APTIC-25787 02

METHOD FOR MANUFACTURING SULFUR BY THE REDUCTION OF SULFUR DIOXIDE.
APTIC-25795 02

SULPHUR REMOVAL FROM GASES.
APTIC-25814 02

PROCEDURE FOR MANUFACTURING SULFUR BY THE REDUCTION OF SULFUROUS ACID.
APTIC-25972 02

METHOD OF MANUFACTURING SULFUR FROM GASES CONTAINING SULFUR DIOXIDE.
APTIC-25973 02

METHOD OF MANUFACTURING SULFUR BY THE REDUCTION OF SULFUR DIOXIDE.
APTIC-25974 02

PREPARATION OF SULFUR BY THE INTERACTION OF SULFUR DIOXIDE CONTAINING GASES WITH HEATED CARBON IN THE PRESENCE OF METAL COMPOUNDS.
APTIC-26165 02

PROCEDURE FOR THE MANUFACTURE OF SULFUR FROM SULFUR DIOXIDE OR FROM GAS MIXTURES CONTAINING SULFUR DIOXIDE.
APTIC-26178 02

METHOD FOR OBTAINING SULFUR FROM THE GASEOUS PRODUCTS GIVEN OFF BY THE ROASTING AND SMELTING OF SULFIDE ORES.
APTIC-26179 02

IMPROVED METHOD OF MAKING SULPHUR FROM SULPHUR DIOXIDE.
APTIC-26197 02

REFRACTIVE INDEX
DETERMINATION OF POLLUTANTS IN INDUSTRY WITH THE USE OF MINE INTERFEROMETER.
APTIC-24930 03

METHOD AND APPARATUS FOR DETERMINING THE PRESENCE OF VAPOR IN A GAS.
APTIC-25912 03

MICROSCOPIC IDENTIFICATION OF TOXIC DUSTS.
APTIC-25970 03

REFRACTORIES
'REFA' REFRACTORY TILE FOR SMOKESTACKS.
APTIC-25652 06

HOW AIR POLLUTION CAN BE CONTROLLED IN A PLANT.
APTIC-25939 02

REGULATIONS
AIR POLLUTION.
APTIC-24759 14

THE CONTROL OF ORGANIC SOLVENTS.
APTIC-25592 01

PROPOSED IMPLEMENTATION PLAN FOR THE CONTROL OF PARTICULATES AND SULFUR OXIDES FOR THE STATE OF OHIO PORTION OF THE METROPOLITAN CINCINNATI INTERSTATE AIR QUALITY CONTROL REGION.
APTIC-25688 12

THE HUNDRED MEASURES.
APTIC-25731 12

RENDERING
AIR POLLUTION CAUSED BY AGRICULTURE AND FORESTRY   ODOR.
APTIC-25977 02

QUALITATIVE ANALYSES OF ODOR COMPONENTS IN THE PYROLYSIS OF FEATHER IN THE LABORATORY TEST.
APTIC-26014 02

REPRODUCTION
EFFECT OF AUTOMOBILE EXHAUST ON CELL GROWTH IN VITRO.
APTIC-25604 03

RESEARCH INSTITUTES

THE AIR POLLUTION RESEARCH PROGRAM OF THE COORDINATING RESEARCH COUNCIL.
APTIC-25965 12

RESEARCH METHODOLOGIES
THE JOINT ACTION OF ATMOSPHERIC POLLUTIONS ON MAN.
APTIC-24688 07

THE CURRENT STATUS OF CANCER RESEARCH.
APTIC-24971 07

ORGANIZATION OR DEVELOPMENT OF EUROPEAN COOPERATION IN RESEARCH, STANDARDIZATION, AND DOCUMENTATION CONCERNING THE CAMPAIGN AGAINST AIR POLLUTION.
APTIC-25628 14

ATMOSPHERIC REACTION STUDIES IN THE LOS ANGELES BASIN. VOLUME I. PROGRAM DESIGN AND METHODOLOGY DATA SUMMARY AND DISCUSSION. 1969. (FINAL REPORT).
APTIC-25837 04

TESTS TO ASSESS EFFECTS OF LOW LEVELS OF AIR POLLUTANTS ON HUMAN HEALTH.
APTIC-25874 07

SOME PROBLEMS OF ATMOSPHERIC CHEMISTRY.
APTIC-25925 03

RESEARCH PROGRAMS
FUNDING FOR 1968 PUBLIC NUISANCE INVESTIGATION RESEARCH PATHOLOGICAL-CHEMICAL RESEARCH OF THE HUMAN LUNG POLLUTION BY AIR POLLUTION.
APTIC-24616 07

ENGINEERING RESEARCH AND DEVELOPMENT IN AIR-POLLUTION CONTROL.
APTIC-25773 02

INTRODUCTION AND RESEARCH RECOMMENDATIONS.
APTIC-25839 13

INTRODUCTION AND SUMMARY.
APTIC-25840 07

RESEARCH AND DEVELOPMENT OF AIR POLLUTION CONTROL TECHNOLOGY IN THE UNITED STATES. PART II.
APTIC-25895 02

CURRENT PROBLEMS OF THE THEORY OF ATMOSPHERIC CORROSION.
APTIC-25937 09

THE AIR POLLUTION RESEARCH PROGRAM OF THE COORDINATING RESEARCH COUNCIL.
APTIC-25965 12

ON DEVELOPMENT OF DESULFURIZATION TECHNOLOGY ONE OF MITI'S BIG PROJECTS.
APTIC-26005 02

RESIDUAL OILS
NEW WAY TO DESULFURIZE RESIDS.
APTIC-24830 02

EBULLATED (SIC) BED H-OIL METHOD.
APTIC-26006 02

TRICKLING PACKED BED REACTORS.
APTIC-26065 02

GULF METHOD.
APTIC-26066 02

ON HYDROCRACKING DESULFURIZATION CATALYST FOR RESIDUAL OIL.
APTIC-26132 02

ON UOP RCD ISOMAX METHOD.
APTIC-26133 02

RESPIRATORY DISEASES
THE THREAT POSED BY DUST AND INDUSTRIAL GASES EMITTED BY CENTRAL HEATING PLANTS AND OTHER AIR POLLUTION SOURCES.
APTIC-22246 07

TOXICITY OF NO2 VAPORS AT VERY LOW LEVELS. A PRELIMINARY REPORT.
APTIC-24588 07

AIR POLLUTION VI. BRONCHIAL-PULMONARY ALTERATIONS CAUSED BY AIR POLLUTION.
APTIC-24660 07

RESPIRATORY DAMAGE DUE TO ATMOSPHERIC POLLUTANTS IN THE ENGLISH SPARROW, PASSER DOMESTICUS.
APTIC-25577 08

INTERMITTENT AIR POLLUTION EPISODE IN NEW YORK CITY, 1962.
APTIC-25829 07

NITROGEN DIOXIDE AND LOWER RESPIRATORY ILLNESS.
APTIC-25966 07

POSSIBLE EFFECTS OF AIR POLLUTION ON THE COURSE OF INFECTIOUS RESPIRATORY DISEASE.
APTIC-25999 07

STATE OF THE ART.
APTIC-26000 07

THE INFLUENCE OF AIR POLLUTION ON RESPIRATORY APPARATUS OF THE INHABITANTS OF BOTH OTAKE AND KURE CITIES.
APTIC-26025 07

ON RELATIONSHIP OF CHRONIC RESPIRATORY DISEASES TO AIR POLLUTION.
APTIC-26032 07

STUDIES ON RESPIRATORY TRACT DISEASES CAUSED BY AIR POLLUTION --SURVEY OF PUBLIC NUISANCES GRANT BY THE HEALTH AND WELFARE MINISTRY, IN 1967.
APTIC-26053 07

SOME OBSERVATIONS ON ANIMALS EXPOSED TO AIR POLLUTANTS ESPECIALLY SULPHUR OXIDES.
APTIC-26116 07

REPORT ON THE EPIDEMIOLOGICAL INVESTIGATION OF THE HEALTH EFFECTS OF AIR POLLUTION AND REPORT ON THE INVESTIGATION OF INFANT DEATHS IN THE YOKKAICHI DISTRICT.
APTIC-26169 07

EFFECTS OF PHOTOCHEMICAL POLLUTANTS ON THE RESPIRATORY TRACT.
APTIC-26227 07

PRESENT STATE OF AIR POLLUTION IN YOKKAICHI AND VARIOUS MEDICAL PROBLEMS ABOUT IT.
APTIC-26305 07

RESPIRATORY DISEASES NITROGEN DIOXIDE (NO2)
AN EVALUATION OF THE ROLE OF NITROGEN DIOXIDE IN THE DEVELOPMENT OF RESPIRATORY DISEASES IN MAN.
APTIC-25987 07

RESPIRATORY FUNCTIONS
MECHANISM OF TOXIC VAPOUR UPTAKE BY LUNG. I. EXPERIMENTAL APPARATURE RECORDING ORGANIC VAPOUR CONCENTRATIONS IN EXPIRED AIR.
APTIC-24648 07

THE EFFECT OF CARBON MONOXIDE ON TISSUE RESPIRATION. CHRONIC CARBON MONOXIDE POISONING SERIES VI.
APTIC-25800 07

STUDIES ON MASS EXAMINATION BY INTRADERMAL REACTION AGAINST HOUSE DUST EXTRACT AMONG SCHOOL CHILDREN IN THE AIR POLLUTED AND UNPOLLUTED AREA. REPORT II. RELATIONS BETWEEN THE INTRADERMAL REACTION AND INFLUENCES OF AIR POLLUTION ON THE HUMAN BODY.
APTIC-26004 07

RESPIRATORY SYSTEM
FUNDING FOR 1968 PUBLIC NUISANCE INVESTIGATION RESEARCH PATHOLOGICAL-CHEMICAL RESEARCH OF THE HUMAN LUNG POLLUTION BY AIR POLLUTION.
APTIC-24616 07

DUST FALL IN THE VICINITY OF CEMENT FACTORIES AS IT RELATES TO POSSIBLE HEALTH HAZARDS PART 2.
APTIC-24708 07

ABSORPTION OF NO AND NO2 IN SMALL AND LARGE CONCENTRATIONS THROUGH INHALATION.
APTIC-24820 07

ACTUAL REPORT OF INFLUENCE OF AIR POLLUTION ON THE BODIES.
APTIC-26306 07

RETENTION
EXPERIMENTAL STUDIES OF INHALED MATERIALS. A BASIS FOR RESPIRATORY MODELS.
APTIC-25883 07

LEAD IN THE ENVIRONMENT AND ITS EFFECT ON MAN IN JAPAN.
APTIC-26260 07

RHODE ISLAND
REPORT FOR CONSULTATION ON THE METROPOLITAN PROVIDENCE INTERSTATE AIR QUALITY CONTROL REGION (RHODE ISLAND-MASSACHUSETTS).
APTIC-12569 12

RICKETS
SMOG AND RICKETS.
APTIC-26033 07

RECENT RICKETS IN INFANTS OF TOKYO METROPOLIS.
APTIC-26034 07

ROSSVILLE
CHATTANOOGA, TENNESSEE -- ROSSVILLE, GEORGIA INTERSTATE AIR QUALITY STUDY 1967-1968.
APTIC-26086 04

ROTARY MACHINES
ROTARY MACHINES FOR EXTREME CLIMATIC CONDITIONS.
APTIC-25741 09

ROTARY PISTON ENGINES
THE EXHAUST EMISSION CONTROL SYSTEM FOR ROTARY ENGINES.
APTIC-26008 02

RUBBER
CARCINOGENIC HYDROCARBONS AND RELATED COMPOUNDS IN PROCESSED RUBBER.
APTIC-24629 01

APTIC-24629 01

OZONE CRACKING OF RUBBERS.
APTIC-24799 09

CORROSION ASPECTS OF AIR POLLUTION IN THE SAN FRANCISCO BAY

AREA--RUBBER PRODUCTS.
APTIC-25585 09

RUBBER MANUFACTURING
AN EXAMPLE OF FORMALDEHYDE GAS CONTROL PROJECT.
APTIC-26074 02

RYFLYKE
PNEUMONIA IN THE AREA OF THE SAUDA FACTORIES OF RYFLYKE.
APTIC-24586 07

SACRAMENTO
A SUGGESTED PROGRAM FOR THE SACRAMENTO REGION.
APTIC-24059 12

SAFETY EQUIPMENT
RESPIRATOR FILTER PENETRATION USING SODIUM CHLORIDE AEROSOL.
APTIC-25611 03

SALT LAKE VALLEY
AIR POLLUTION POTENTIAL OVER THE SALT LAKE VALLEY OF UTAH AS RELATED TO STABILITY AND WIND SPEED.
APTIC-26264 05

SAMPLERS
CALIBRATION OF A TWO-STAGE AIR SAMPLER.
APTIC-22722 03

PROBLEMS IN THE GRAVIMETRIC MEASUREMENT OF RESPIRABLE COAL MINE DUST.
APTIC-24656 03

A MODIFIED TUBULAR ELECTROFILTER FOR COLLECTING DUST SAMPLES FROM THE AIR.
APTIC-24686 03

DETERMINATION OF DUST FALL WITH GLASS FILTER PANS.
APTIC-24861 03

DEVICE FOR SAMPLING AEROSOLS.
APTIC-25699 03

ATMOSPHERE SAMPLING DEVICE.
APTIC-25712 03

ON MEASURING DUST SUSPENDED IN THE ATMOSPHERE - MAINLY ON THE RECENT AND MOST FREQUENTLY USED INSTRUMENTS.
APTIC-26047 03

SAMPLING METHODS
A COMPARATIVE STUDY OF OXIDANTS AND OZONE IN LOS ANGELES ATMOSPHERE.
APTIC-24597 03

AIR POLLUTION CONTROL HEALTH ASPECTS AND MICROTECHNIQUES.
APTIC-24603 03

MEASUREMENT OF AUTOMOBILE EXHAUST GAS.
APTIC-24638 03

THE USE OF SNOW SAMPLES IN AIR POLLUTION STUDIES.
APTIC-24740 03

TESTING PROCEDURES AND EQUIPMENT.
APTIC-24960 03

EXPERIMENTS ON ANISOKINETIC SAMPLING ERRORS FOR SOLID-LIQUID TWO-PHASE FLOW.
APTIC-25574 03

THE APPLICATION OF AIR SAMPLING IN THE EVALUATION AND CONTROL OF THE OCCUPATIONAL ENVIRONMENT.
APTIC-25608 03

CURRENT INFORMATION ON THE QUANTITIES OF FLUORIDE FOUND IN AIR, FOOD, AND WATER.
APTIC-25806 03

THE ATMOSPHERE TESTING DILEMMA.
APTIC-25821 03

THE ABSOLUTE EFFICIENCY OF THE IMPINGER AND OF THE ELECTROSTATIC PRECIPITATOR IN THE SAMPLING OF AIR CONTAINING METALLIC LEAD FUME.
APTIC-26145 03

SAMPLING PROBES
PROBLEMS ON MEASUREMENT OF THE CONCENTRATION OF PARTICULATE CONTAMINANTS IN SMOKE DUST.
APTIC-26020 03

SCANDINAVIA
REGIONAL DIFFERENCES IN THE DEPOSITION OF HEAVY METALS OVER SCANDINAVIA.
APTIC-23971 04

SCAVENGING
THE CALCULATION OF PRECIPITATION SCAVENGING.
APTIC-24956 05

CALCULATION OF PRECIPITATION SCAVENGING OF PARTICULATES AND GASES FROM THE ATMOSPHERE.
APTIC-25951 05

SCOTCH PINE
SOME PECULIARITIES OF THE SUSCEPTIBILITY OF SCOTCH PINE TO SULFUR DIOXIDE INJURY.
APTIC-2[illegible]53 08

SCREEN FILTERS
METHOD FOR DEPOSITING PARTICLES.
APTIC-25569 02

SCRUBBERS
INVESTIGATION OF THE PROCESSES OF MASS EXCHANGE AND CHEMOSORPTION IN ROTATION-TYPE EQUIPMENT.
APTIC-24769 02

IMPROVING THE GAS CLEANING ON 100 T OXYGEN CONVERTERS.
APTIC-24809 02

TWO-STAGE MIST ELIMINATORS FOR SULFURIC ACID PLANTS.
APTIC-24833 02

PLUME EFFECTS OF NATURAL DRAFT HYPERBOLIC COOLING TOWERS.
APTIC-24835 05

INVESTIGATION OF MASS TRANSFER IN A SCRUBBER WITH TAPERED-SLOT TRAYS.
APTIC-24885 02

REMOVAL OF SULFUR DIOXIDE FROM POWER-PLANT STACK GASES.
APTIC-24916 02

DE-ENTRAINMENT IN PLATE COLUMN.
APTIC-25573 02

ANTIPOLLUTION APPARATUS.
APTIC-25706 02

CHEMICAL SUPPRESSION OF NITROGEN OXIDES.
APTIC-25714 02

CONCENTRATION/RECOVERY METHOD FOR LOW-DENSITY SULFUR DIOXIDE.
APTIC-26039 02

AN ABSORPTION SCRUBBER FOR DESULFURIZATION.
APTIC-26159 02

CLOSED-TOP CUPOLAS AND AIR CONTAMINATION.
APTIC-26184 02

THE BURKHEISER GAS PURIFICATION PROCESS FOR THE RECOVERY OF AMMONIA, CYANOGEN AND HYDROGEN SULFIDE.
APTIC-26201 02

METHOD FOR PROCESSING LYE OBTAINED FROM THE SCRUBBING WITH AMMONIA OF GASES CONTAINING SULFUR DIOXIDE AND POSSIBLY SULFUR TRIOXIDE.
APTIC-26240 02

NEW PENNSALT HF PLANT.
APTIC-26248 02

SEALS
FILTER FRAME SEAL.
APTIC-25571 02

SEASONAL
ON THE TYPE OF AIR POLLUTION OF MIZUSHIMA, OKAYAMA PREFECTURE.
APTIC-26282 08

SECONDARY STANDARDS
FLUORIDE FOILERS.
APTIC-25631 03

SEDIMENTATION
SEDIMENTATION OF POWDERED SOLIDS.
APTIC-24973 06

CENTRIFUGE SEDIMENTATION SIZE ANALYSIS OF SAMPLES OF AIRBORNE DUSTS COLLECTED IN MEMBRANE FILTERS.
APTIC-25843 03

A NEW SEDIMENTATION METHOD FOR DUST SPECIMENS.
APTIC-25869 03

SELENIUM COMPOUNDS
ACTIVATION ANALYSIS OF AIRBORNE SELENIUM AS A POSSIBLE INDICATOR OF ATMOSPHERIC SULFUR POLLUTANTS.
APTIC-26069 03

SELF-CLEANING
EXAMINATION OF THE BEHAVIOR OF HIGH VOLTAGE INSULATORS UNDER POLLUTION CONDITIONS, USING A CONVENTIONAL TESTING METHOD, WITH PARTICULAR REFERENCE TO THE SELF-CLEANING APTITUDE.
APTIC-25926 11

SEQUENCE
PATHOBIOLOGY OF AIR POLLUTANTS.
APTIC-25971 07

SETTLING PARTICLES
SUMMARIES OF LITERATURE RELATED TO AIR POLLUTION.
APTIC-24918 07

SEWAGE
ODOR CONTROL WITH CHLORINE CUTS COST.
APTIC-25623 02

SEWAGE TREATMENT
OZONE SYNTHESIS FOR WATER TREATMENT BY HIGH ENERGY RADIATION.
APTIC-24081 06

INSTRUMENTATION IN POLLUTION CONTROL.
APTIC-25990 03

SIEVE ANALYSIS
RESULTS OBTAINED WITH A NEW METHOD OF DETERMINATION OF THE

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED DUST.
APTIC-25072 03

SIEVE PLATE COLUMNS
SEPARATION OF SMALL PARTICLES FROM AIR IN A SIEVE PLATE
COLUMN.
APTIC-24793 02

SILICON COMPOUNDS
PERMEABLE MEMBRANE.
APTIC-24694 02

HIGH-EFFICIENCY FIBRE FILTERS FOR THE TREATMENT OF FINE
MISTS.
APTIC-24695 02

METHODS OF SAMPLING SUSPENDED DUST FOR MEASURING THE FREE
SILICA CONTENT.
APTIC-26076 03

STUDY OF PULMONARY DUST DEPOSITS WITH ELECTRON MICROSCOPE
AND MICROANALYSIS WITH AN ELECTRONIC PROBE.
APTIC-26110 07

SILICOSIS
ON THE ROENTGENOLOGICAL DETECTABILITY OF DUST DEPOSITS IN
THE LUNGS. STUDIES ON THE ALDERSON-RANDO PHANTOM.
APTIC-18289 06

SILOXENE
THE USE OF SILOXENE FOR DETERMINING SMALL AMOUNTS OF
NITROGEN DIOXIDE.
APTIC-24839 03

SILO-FILLERS' DISEASE
NITROGEN DIOXIDE POISONING IN SILO ATMOSPHERES. (SILO-
FILLERS' DISEASE).
APTIC-25586 07

SIMULATION
MODEL TESTS ON FLOW FROM A BUILDING VENTILATION STACK.
APTIC-24803 05

REAL TIME SIMULATION OF ATMOSPHERIC BALLOON ENVIRONMENT.
APTIC-25823 05

SIMULATION OF PHOTOCHEMICAL REACTION IN POLLUTED AIR.
APTIC-25887 05

A MODEL OF GLOBAL CLIMATE AND ECOLOGY.
APTIC-25947 05

LABORATORY SIMULATION OF THE ATMOSPHERIC BOUNDARY LAYER.
APTIC-25981 05

SINGLET MOLECULAR OXYGEN
SINGLET MOLECULAR OXYGEN AND THE PHOTOCHEMISTRY OF URBAN
ATMOSPHERES.
APTIC-24825 05

SINTERING
SELECTION OF GAS CLEANING EQUIPMENT FOR AN ORE PREPARATION
PLANT.
APTIC-24676 02

SKIN
SATURATED HYDROCARBONS IN SKIN SURFACE LIPIDS.
APTIC-26221 07

SLOW ELECTRONS
TABLES OF DRIFT VELOCITIES OF SLOW ELECTRONS IN HELIUM,
NEON, ARGON, KRYPTON, XENON, HYDROGEN, DEUTERIUM, NITROGEN,
CARBON MONOXIDE, CARBON DIOXIDE, WATER VAPOR, NITROUS OXIDE,
AND AMMONIA.
APTIC-22681 06

SMOG
DESIGN OF A FACILITY (SMOG CHAMBER) FOR STUDYING
PHOTOCHEMICAL REACTIONS UNDER SIMULATED TROPOSPHERIC
CONDITIONS.
APTIC-24659 03

PAINT INDUSTRY SMOG CHAMBER. I. DESIGN AND VALIDATION OF A
SMOG CHAMBER.
APTIC-24711 07

PROGRESS IN SMOG CONTROL AT LOS ANGELES.
APTIC-24744 04

AIR POLLUTION.
APTIC-24759 14

PRODUCTION AND DESTRUCTION MECHANISMS FOR O2 (1 DELTA G) IN
THE LOWER ATMOSPHERE.
APTIC-24836 05

ANTHOCYANIN FORMATION AS A RESPONSE TO OZONE AND SMOG
TREATMENT IN RUMEX CRISPUS L.
APTIC-24883 08

CONTROL DEVICES.
APTIC-25632 02

ATMOSPHERIC REACTION STUDIES IN THE LOS ANGELES BASIN.
(FINAL REPORT).
APTIC-25994 04

SMOG AND RICKETS.
APTIC-26033 07

INVESTIGATION ON INJURY TO PLANTS FROM AIR POLLUTION IN THE
LOS ANGELES AREA.
APTIC-26146 08

SMOKE SHADE
AIR POLLUTION POTENTIAL OVER THE SALT LAKE VALLEY OF UTAH AS
RELATED TO STABILITY AND WIND SPEED.
APTIC-26264 05

SMOKES
ORIGINAL TREATISES CONCERNING THE USABILITY OF THE
SPECTROSCOPIC PHAOPHYTIN-TEST IN SMOKE-DAMAGE DIAGNOSIS.
APTIC-24851 08

THE INFLUENCE OF SMOKE AND GAS ON THE FLOWERING AND FRUITING
OF SOME TREES AND SHRUBS.
APTIC-24865 08

TOBACCO AND THE NONSMOKER. A STUDY OF SUBJECTIVE SYMPTOMS.
APTIC-24893 07

APTIC-24893 07

DE-DUSTING DEVICE FOR SMOKE AND OTHER GASEOUS FLUIDS.
APTIC-25550 02

FLAME STACK BURNER ASSEMBLY.
APTIC-25558 02

BURNER MEANS FOR ELIMINATING SMOKE.
APTIC-25570 02

AESTHETIC DIESEL SMOKE LEVELS IN BOTH ACCELERATION AND LUG
DOWN ARE SET TO BEGIN IN JANUARY 1970.
APTIC-25619 11

ANTIPOLLUTION APPARATUS.
APTIC-25706 02

SMOKE ABATEMENT DEVICE.
APTIC-25716 02

SURVEY OF CORROSION AND ATMOSPHERIC POLLUTION IN AND AROUND
SHEFFIELD.
APTIC-25840 09

AIR POLLUTION SMOKE AND SO2.
APTIC-26094 04

DIFFUSION OF SMOKE FROM A HIGH STACK.
APTIC-26141 05

REDUCING JET POLLUTION BEFORE IT BECOMES SERIOUS.
APTIC-26181 02

SMOKING
TOBACCO AND THE NONSMOKER. A STUDY OF SUBJECTIVE SYMPTOMS.
APTIC-24893 07

APTIC-24893 07

SPIROGRAM AND WASH-OUT CURVE DO THESE METHODS DISCRIMINATE
BETWEEN THE EFFECTS OF DUST INHALATION AND SMOKING UPON LUNG
VENTILATION.
APTIC-25576 07

SNOW
THE USE OF SNOW SAMPLES IN AIR POLLUTION STUDIES.
APTIC-24740 03

HYDROCHEMICAL STUDY OF ATMOSPHERIC PRECIPITATION.
APTIC-25812 05

SOCIAL ATTITUDES
LET'S GANG UP ON POLLUTION.
APTIC-25729 03

TWO SPEECHES MADE BY MONSIEUR GEORGES POMPIDOU PRESIDENT OF
THE FRENCH REPUBLIC.
APTIC-25730 13

THE GROWTH OF PUBLIC OPINION.
APTIC-25776 13

AIR POLLUTION A SOCIOLOGICAL PERSPECTIVE.
APTIC-25983 13

SOCIO-ECONOMIC FACTORS
NATIONAL SURVEY OF THE ODOR PROBLEM. PHASE I OF A STUDY OF
THE SOCIAL AND ECONOMIC IMPACT OF ODORS APPENDIX.
APTIC-24768 13

UTILITY RESPONSIBILITY FOR PROTECTION OF THE ENVIRONMENT.
APTIC-24951 01

INTRODUCTION AND RESEARCH RECOMMENDATIONS.
APTIC-25839 13

ECONOMIC PROJECTIONS FOR AIR QUALITY CONTROL REGIONS.
APTIC-25993 10

DIFFERENTIAL RESPONSES TO AIR POLLUTION AS AN ENVIRONMENTAL
HEALTH PROBLEM.
APTIC-26303 13

SODIUM CHLORIDE
RESPIRATOR FILTER PENETRATION USING SODIUM CHLORIDE AEROSOL.
APTIC-25611 03

SOILS
SOME DATA ON THE WATER BALANCE IN PLANTS IN THE PRESENCE OF
FLUOR IN THE SUBSTRATE.

APTIC-24787 08

BIOCHEMICAL PHENOMENA IN THE SOIL IN EXHALATION AREAS.
APTIC-25660 08

SOLAR RADIATION
SOME STATISTICAL ASPECTS OF LONG-TERM FLUCTUATIONS IN SOLAR AND ATMOSPHERIC PHENOMENA.
APTIC-24758 05

POSSIBLE CAUSES OF REDUCTION IN DIRECT SOLAR RADIATION.
APTIC-24896 05

AN URBAN-CLIMATOLOGICAL STUDY OF THE ATTENUATION OF SOLAR RADIATION BY AIR POLLUTION IN TOKYO.
APTIC-26059 05

SOLDERING
AIR POLLUTION FROM SOLDERING FUMES.
APTIC-25624 07

SOLID WASTE DISPOSAL
THE SOLUTION OF AIR POLLUTION CAN CAUSE WATER POLLUTION.
APTIC-24842 02

COMBUSTION POWER UNIT -- 400 CPU-400.
APTIC-24954 02

FLY ASH AIDS IN SLUDGE DISPOSAL.
APTIC-25694 02

CONVERSION OF URBAN REFUSE TO OIL.
APTIC-25753 02

EMISSION OF HYDROGEN CHLORIDE DURING REFUSE INCINERATION.
APTIC-25862 01

REFUSE TREATMENT BY COMPRESSION.
APTIC-26125 02

AIR POLLUTION CAUSED BY AGRICULTURE, FORESTRY AND THE FOREST PRODUCTS INDUSTRIES COMBUSTION.
APTIC-26255 02

SOLIDS
METER FOR DETERMINING MASS FLOW OF SOLIDS IN MULTI-PHASE FLUIDS.
APTIC-24590 06

THE EQUILIBRIUM FLOW OF A GAS-PARTICLE SYSTEM.
APTIC-24860 06

SOLUBILITY
IMPROVEMENTS IN RECOVERY OF SULPHUR DIOXIDE FROM GASES.
APTIC-24591 02

ABSORPTION OF SO2 GAS BY VARIOUS SOLVENTS.
APTIC-24735 02

SOLUBILITY OF O2 AND CO IN BLOOD AND PULMONARY AND PLACENTAL TISSUE.
APTIC-24892 07

SOLUBILITY OF SULPHUR DIOXIDE IN SATURATED MAGNESIUM BISULPHITE SOLUTION TAPPI DATA SHEET 164 SOLUBILITY OF SULPHUR DIOXIDE IN SATURATED MAGNESIUM BISULPHITE SOLUTION TAPPI DATA SHEET 165 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 5 C TAPPI DATA SHEET 166 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 15 C TAPPI DATA SHEET 167 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 25 C TAPPI DATA SHEET 168 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 35 C TAPPI DATA SHEET 169 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 50 C TAPPI DATA SHEET 170 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 60 C TAPPI DATA SHEET 171.
APTIC-25672 06

SOLVENT REFINING (LOW ASH)
SULFUR EXTRACTION USING TRICHLOROETHYLENE IN PRESENCE OF LIMESTONE, TRONA, AND SODA ASH.
APTIC-25552 02

SOLVENTS
ABSORPTION OF SO2 GAS BY VARIOUS SOLVENTS.
APTIC-24735 02

THE CONTROL OF ORGANIC SOLVENTS.
APTIC-25592 01

PRODUCTION OF SOUR GAS-SULFUR WELLS EMPLOYING A SULFUR SOLVENT.
APTIC-25708 02

POWER AND INDUSTRY HYDROCARBONS AND OTHER ORGANIC SPECIES.
APTIC-26231 02

REMOVAL OF ODOR OF ORGANIC SOLVENT AND UTILIZATION OF RECOVERED HEAT BY U.O.P. CATALYTIC COMBUSTION SYSTEM.
APTIC-26308 02

SOOT
SOOT OBTAINED FROM SOLID FUELS.
APTIC-25545 01

OBJECTIONABLE SOOT EMISSIONS.
APTIC-25549 01

SOOT FALL
SURVEY OF ACTUAL CONDITIONS OF AIR POLLUTION. 1. AIR POLLUTION IN KEIHIN INDUSTRIAL AREA (1).
APTIC-26130 04

SOUND WAVES
SOUND PROPAGATION IN AN AEROSOL.
APTIC-24806 05

SOURCE SAMPLING
A COMPARISON OF NAPCA AND IIA SOURCE SAMPLING METHODS.
APTIC-24582 03

SOURCES
REFERENCE BOOK SUMMARY OF NATIONWIDE EMISSIONS.
APTIC-12496 01

AIR POLLUTION ALONG THE MEXICAN-AMERICAN FRONTIER.
APTIC-26299 01

SO2 REMOVAL (COMBUSTION PRODUCTS)
HERE'S WHAT SO2 REMOVAL COSTS.
APTIC-22444 10

PROCESS FOR OBTAINING ELEMENTAL SULFUR FROM SULFUR DIOXIDE OR GASES CONTAINING IT.
APTIC-23385 02

RECOVERY OF SULPHUR.
APTIC-24576 02

RECENT PROCESSES FOR THE REMOVAL OF SULFUR COMPOUNDS FROM GASES, AS SEEN IN GERMAN PATENTS FOR THE YEAR 1964.
APTIC-24594 02

PROCESS FOR RECOVERING ELEMENTAL SULFUR FROM GASES CONTAINING SULFUR DIOXIDE.
APTIC-24599 02

DESULFURIZATION OF FLUE GASES- THE PRESENT SITUATION. PART I.
APTIC-24707 02

THE FELD SCRUBBER FOR CLEANING METALLURGICAL SMOKE.
APTIC-24724 02

PROCESS FOR THE CONVERSION OF HYDROGEN SULFIDE WITH SULFUR DIOXIDE TO ELEMENTARY SULFUR.
APTIC-24751 02

PROCEDURE FOR RECOVERING ELEMENTAL SULFUR FROM SULFUROUS GASES.
APTIC-24777 02

IMPROVEMENT IN THE PROCESS OF PURIFYING FUMES AND GASES.
APTIC-24785 02

IMPROVED PROCEDURE FOR MANUFACTURING SULFUR.
APTIC-24786 02

METHOD FOR CONVERTING HYDROGEN SULFIDE TO OBTAIN SULFUR.
APTIC-24908 02

REMOVAL OF SULFUR DIOXIDE FROM POWER-PLANT STACK GASES.
APTIC-24916 02

CAN EMISSIONS BE REDUCED
APTIC-25584 02

PROCESS FOR MANUFACTURING SULFUR FROM SULFUR OXIDES, USING CARBON MONOXIDE.
APTIC-25649 02

PROCESS FOR OBTAINING ELEMENTAL SULFUR FROM THE WASTE GASES OF CARBON DISULFIDE MANUFACTURING.
APTIC-25650 02

CONVERSION OF SULFUR DIOXIDE TO SULFUR TRIOXIDE.
APTIC-25651 02

THE MANUFACTURE OF PURE SULFUR DIOXIDE AND SULFUR FROM GASES CONTAINING SMALL AMOUNTS OF SULFUR.
APTIC-25670 02

RESEARCH AND DEVELOPMENT OF STACK GAS DESULFURIZATION PROCESS.
APTIC-25702 02

STUDY ON THE REMOVAL EFFICIENCY OF SO2 GASES BY A WET-TYPE ELECTRIC PRECIPITATOR.
APTIC-25720 02

FEASIBILITY OF FABRIC FILTER AS GAS-SOLID CONTACTOR TO CONTROL GASEOUS POLLUTANTS. (FINAL REPORT).
APTIC-25785 02

METHOD FOR MANUFACTURING SULFUR.
APTIC-25787 02

CATALYTIC HYDROGENATION OF SULFUR DIOXIDE.
APTIC-25789 02

ACTIVITIES RELATED TO THE NON-MINING INDUSTRIES.
APTIC-25794 02

METHOD FOR MANUFACTURING SULFUR BY THE REDUCTION OF SULFUR DIOXIDE.
APTIC-25795 02

DESULFURISATION PROCESS IN WHOLE INDUSTRIES. PART I.
APTIC-25882 02

RESEARCH AND DEVELOPMENT OF AIR POLLUTION CONTROL TECHNOLOGY

IN THE UNITED STATES. PART II.
APTIC-25895 02

TRENDS IN THE UTILIZATION OF THE MOST IMPORTANT FORMS OF SULFUR-CONTAINING RAW MATERIAL.
APTIC-25938 02

REMOVAL OF SULFUR FROM FUELS AND PRODUCTS OF COMBUSTION.
APTIC-25961 02

SMELTERY FUMES--THEIR CONDENSATION AND UTILIZATION.
APTIC-25969 02

PROCEDURE FOR MANUFACTURING SULFUR BY THE REDUCTION OF SULFUROUS ACID.
APTIC-25972 02

METHOD OF MANUFACTURING SULFUR FROM GASES CONTAINING SULFUR DIOXIDE.
APTIC-25973 02

METHOD OF MANUFACTURING SULFUR BY THE REDUCTION OF SULFUR DIOXIDE.
APTIC-25974 02

REGENERATION METHOD OF GAS DESULFURIZATION LIQUOR.
APTIC-26046 02

THE FORMATION OF CARBON DISULFIDE RESULTING FROM THE REACTION BETWEEN SULFUR DIOXIDE AND COAL.
APTIC-26155 02

METHOD FOR THE DESULFURIZATION OF GASES CONTAINING HYDROGEN SULFIDE OR SULFUR DIOXIDE AND FOR THE PREPARATION OF CRYSTALLINE SULFUR.
APTIC-26163 02

PROCEDURE FOR THE MANUFACTURE OF SULFUR FROM SULFUR DIOXIDE OR FROM GAS MIXTURES CONTAINING SULFUR DIOXIDE.
APTIC-26178 02

METHOD FOR OBTAINING SULFUR FROM THE GASEOUS PRODUCTS GIVEN OFF BY THE ROASTING AND SMELTING OF SULFIDE ORES.
APTIC-26179 02

METHOD FOR MANUFACTURING SULFUR FROM ROASTING GASES CONTAINING SULFUR DIOXIDE.
APTIC-26180 02

STUDY OF THE SO2 OXIDATION IN SOLUTION AND ITS ROLE IN ATMOSPHERIC CHEMISTRY.
APTIC-26185 02

IMPROVED METHOD OF MAKING SULPHUR FROM SULPHUR DIOXIDE.
APTIC-26197 02

METHOD FOR PROCESSING LYE OBTAINED FROM THE SCRUBBING WITH AMMONIA OF GASES CONTAINING SULFUR DIOXIDE AND POSSIBLY SULFUR TRIOXIDE.
APTIC-26240 02

DESULFURIZATION OF LARGE QUANTITIES OF GAS.
APTIC-26242 02

SPACECRAFT ATMOSPHERES
PREDICTING HUMAN PERFORMANCE IN SPACE ENVIRONMENTS.
APTIC-12612 07

REVIEW OF TENTATIVE ABORT, ALERT, 100 AND 1000-DAY LIMITS FOR SPACE CABIN CONTAMINANTS.
APTIC-24957 11

PSYCHOPHARMACOLOGY OF CARBON MONOXIDE UNDER AMBIENT AND ALTITUDE CONDITIONS.
APTIC-24958 07

STUDY OF LONG-TERM ATMOSPHERIC TRACE CONTAMINANT MONITORING AND CONTROL. (FINAL REPORT).
APTIC-25686 03

SPARK ADVANCE
ADJUST SPARK ADVANCE TO CONTROL NOX.
APTIC-26017 02

SPARK IGNITION ENGINES
EFFECT OF TETRAETHYLLEAD ON PREFLAME REACTIONS IN AN ENGINE.
APTIC-24718 01

THE REACTION OF ETHANE IN SPARK IGNITION ENGINE EXHAUST GAS.
APTIC-24747 01

THE DISAPPEARANCE OF ETHYLENE, PROPYLENE, N-BUTANE, AND 1-BUTENE IN SPARK-IGNITION ENGINE EXHAUST.
APTIC-24748 01

THE CALIFORNIA TEST. FIGHT AGAINST AIR POLLUTION BY MEANS OF CONTROL MEASURES APPLICABLE TO NEW AUTOMOBILES IN THE U.S.A.
APTIC-24859 12

OXIDES OF NITROGEN IN THE COMBUSTION PRODUCTS OF AN AMMONIA FUELED RECIPROCATING ENGINE.
APTIC-25825 01

AUTOMOTIVE AIR POLLUTION AND PROBLEMS RELATED TO ITS CONTROL EXPERIMENTATION WITH A HETEROGENEOUS AFTERBURNER.
APTIC-26300 01

SPARK TIMING
ADJUST SPARK ADVANCE TO CONTROL NOX.
APTIC-26017 02

SPECTROMETRY
STATUS REPORT.
APTIC-23503 03

HIGH ALTITUDE RADIATION MEASUREMENTS. (QUARTERLY REPORT).
APTIC-24753 03

SPECTRAL TRANSPARENCY OF HAZE IN THE SPECTRAL REGION FROM 0.37 TO 1.0 MICRONS.
APTIC-24805 05

STUDY OF LONG-TERM ATMOSPHERIC TRACE CONTAMINANT MONITORING AND CONTROL. (FINAL REPORT).
APTIC-25686 03

IMPROVEMENT OF X-RAY SPECTROGRAPHIC ANALYSIS OF FILTRATION OF THE L LINES FROM THE PRIMARY BEAM.
APTIC-25822 03

ON THE SIMULTANEOUS MEASUREMENTS OF THE PARTICLE SIZE DISTRIBUTION OF RADIOACTIVE CHARGED AEROSOLS AND CONCENTRATION RATIO OF POSITIVE TO NEGATIVE.
APTIC-25834 03

A SCATTERED LIGHT PARTICLE-SIZE SPECTROMETER FOR SUBMICROSCOPIC AEROSOLS OF HIGH CONCENTRATION.
APTIC-25871 03

REPRESENTATION OF PARTICLE-SIZE DISTRIBUTIONS BY MEANS OF A SIMPLE SPECTROMETER AS AN ACCESSORY TO SCATTERED LIGHT MEASURING DEVICES.
APTIC-26062 03

PARTICLE-SIZE SPECTROMETRY OF AEROSOLS BY LIGHT SCATTERING IN A LASER BEAM AND ITS APPLICATION TO AIR MONITORING AND FILTER TESTING.
APTIC-26214 03

SPECTROMETRY FLUORINE COMPOUNDS
SPECTROCHEMICAL DETERMINATION OF FLUORINE IN PORCELAIN ENAMEL FRITS.
APTIC-26209 03

SPECTROPHOTOMETRY
RAPID ANALYSIS OF LEAD IN AUTOMOBILE EXHAUST GAS.
APTIC-24618 03

APTIC-24618 03

MECHANISM OF TOXIC VAPOUR UPTAKE BY LUNG. I. EXPERIMENTAL APPARATURE RECORDING ORGANIC VAPOUR CONCENTRATIONS IN EXPIRED AIR.
APTIC-24648 07

OZONE ABSORPTION COEFFICIENTS IN THE VISIBLE AND ULTRAVIOLET REGIONS.
APTIC-24701 06

FLAME PHOTOMETRIC DETERMINATION OF LEAD AND MANGANESE IN GASOLINE.
APTIC-24719 03

NEW METHOD OF LIGHT MODULATION FOR DUAL-BEAM PHOTOMETERS AND SPECTROPHOTOMETERS.
APTIC-24897 03

SPECTROCOLORIMETRIC DETERMINATION OF HEXACHLOROCYCLOHEXANE IN THE ATMOSPHERE.
APTIC-24975 03

THE DETERMINATION OF HEAVY METALS IN DUSTFALL BY ATOMIC-ABSORPTION-SPECTROPHOTOMETRY.
APTIC-25535 03

SPECTROPHOTOMETRIC DETERMINATION OF FLUORIDE ION.
APTIC-25668 03

DETERMINATION OF NO2 AND NO IN AIR.
APTIC-25918 03

SPECIFIC SPECTROPHOTOMETRIC MICRODETERMINATION OF BERYLLIUM.
APTIC-25919 03

ANALYSIS OF POLYCYCLIC HYDROCARBONS IN PARTICULATE POLLUTANTS.
APTIC-25920 03

SPECTROPHOTOMETRIC DETERMINATION OF BERYLLIUM AND FLUORIDE USING CHROME AZUROL S.
APTIC-25952 03

QUANTITATIVE DETERMINATION OF METALLIC AIR POLLUTANTS BY EMISSION SPECTROSCOPIC ANALYSIS.
APTIC-26009 03

SPORES
DISTRIBUTION OF FUNGAL SPORE TYPES IN SELECTED AREAS IN TEXAS.
APTIC-12613 01

AECIOSPORE RELEASE IN GYMNOSPORANGIUM.
APTIC-26161 01

SPOT TESTS
FIELD METHOD FOR THE DETERMINATION OF INORGANIC LEAD FUMES IN AIR.
APTIC-25691 03

SPRAY TOWERS
THE FELD SCRUBBER FOR CLEANING METALLURGICAL SMOKE.

APTIC-24724 02

FLUORIDE RECOVERY FROM PHOSPHORUS PRODUCTION.
APTIC-24834 02

FLUE-GAS WASHING TRIALS AND CONCLUSIONS.
APTIC-25663 02

EXHAUST GAS WASHING APPARATUS.
APTIC-25715 02

APPARATUS FOR CONTROL OF AIR POLLUTION.
APTIC-25910 02

REMOVAL OF SULFUR DIOXIDE FROM STACK GASES BY SEA WATER.
APTIC-26248 02

ST LOUIS
CONTINUOUS AIR MONITORING PROJECTS 1968 DATA TABULATIONS AND SUMMARIES, ST. LOUIS.
APTIC-25992 04

ST. LOUIS DISPERSION STUDY. VOLUME I. INSTRUMENTATION, PROCEDURES, AND DATA TABULATIONS.
APTIC-25997 05

STABILITY (ATMOSPHERIC)
ACOUSTIC SOUNDING--A NEW APPROACH TO THE STUDY OF ATMOSPHERIC STRUCTURE.
APTIC-25622 03

USE OF ROUTINE METEOROLOGICAL OBSERVATIONS FOR ESTIMATING ATMOSPHERIC DISPERSION.
APTIC-25935 05

STABILIZATION
STABILIZATION OF TURBULENT DIFFUSION FLAMES.
APTIC-24698 06

STACK GASES
FLUE-GAS WASHING PROCESS. PART TWO.
APTIC-24697 02

SMOG CONTROL HELPS BAG MORE PROFITS.
APTIC-24782 02

APTIC-24782 02

DEVELOPMENT AND TESTING, WITH STANDARDIZED MIXTURES AND ON A VAPOR GENERATOR, OF AN INSTRUMENT FOR MEASURING SO3 IN COMBUSTION PRODUCTS.
APTIC-24879 03

NEW POTENTIAL ABSORBENTS FOR SULFUR OXIDES REMOVAL FROM FLUE GAS.
APTIC-24932 02

A STUDY OF ATMOSPHERIC POLLUTION.
APTIC-24985 04

APTIC-24985 04

METALLURGICAL SMOKE.
APTIC-25605 02

ANALYSIS OF BLAST FURNACE GAS BY GAS-SOLID CHROMATOGRAPHY.
APTIC-25654 03

METHOD FOR THE REMOVAL OF FLUORINE FROM INDUSTRIAL GASES.
APTIC-25658 02

FLUE-GAS WASHING TRIALS AND CONCLUSIONS.
APTIC-25663 02

THE MAXIMA OF SUTTON'S EQUATION CORRECTED FOR DEPOSITION.
APTIC-25669 05

RECOMMENDED GUIDE FOR THE PREDICTION OF THE DISPERSION OF AIRBORNE EFFLUENTS.
APTIC-25682 05

A TRACER TECHNIQUE TO MEASURE DEPOSITION OF STACK EMISSIONS.
APTIC-26139 03

A BRIEF REVIEW OF FLUE GAS TREATMENT.
APTIC-26195 02

CONTAMINATION OF DAIRY FEEDS BY AIR POLLUTION.
APTIC-26276 08

STACK SAMPLING
MEASURING METHODS FOR THE QUANTITATIVE MEASUREMENT OF SOLID PARTICLES IN FLUE GASES.
APTIC-24579 03

STACKS
CONSTRUCTION OF POWER PLANT STACKS IN THE LIGHT OF PRACTICAL EXPERIENCE.
APTIC-22794 14

ON INCREASED CHIMNEY HEIGHT.
APTIC-24585 05

MODEL TESTS ON FLOW FROM A BUILDING VENTILATION STACK.
APTIC-24803 05

FLARE STACK BURNER ASSEMBLY.
APTIC-25558 02

'REFA' REFRACTORY TILE FOR SMOKESTACKS.
APTIC-25652 06

AUTOMATED DESIGN OF STEEL-FRAME SUPPORTED CHIMNEYS.
APTIC-26015 14

A METEOROLOGICALLY OPERATED STACK CONTROL SYSTEM.
APTIC-26148 02

EFFECT OF DILUTING STACK GASES ON DOWNWIND CONCENTRATION.
APTIC-26261 05

STAGNATION
AUTHOR'S REPLY TO THE PRECEDING DISCUSSION.
APTIC-24774 05

STANDARDS
AIR POLLUTION.
APTIC-25610 12

TERMINOLOGY AND UNITS OF MEASURE.
APTIC-25629 14

THE ATMOSPHERE TESTING DILEMMA.
APTIC-25821 03

A COMPARISON OF METHODS FOR TESTING THE FASTNESS TO GAS FADING OF DYES ON ACETATE.
APTIC-26167 03

DEFICIENCIES IN THE AIR QUALITY ACT OF 1967.
APTIC-26196 12

STATE GOVERNMENTS
GUIDELINES FOR THE DEVELOPMENT OF AIR QUALITY STANDARDS AND IMPLEMENTATION PLANS.
APTIC-12494 12

PROGRESS IN STATE AND LOCAL AIR POLLUTION CONTROL UNDER THE CLEAN AIR ACT.
APTIC-12495 12

THE 1968 ANNUAL REPORT OF THE STATE INSTITUTE FOR IMMISSION AND SOIL PROTECTION OF THE STATE OF NORDRHEIN-WESTFALEN IN ESSEN.
APTIC-24612 12

INITIATIVE FOR WATER AND AIR POLLUTION CONTROL.
APTIC-24683 02

A SUMMARY OF FEDERAL, STATE AND LOCAL AIR POLLUTION LAWS.
APTIC-24855 12

PROTECTION OF ENVIRONMENT.
APTIC-25593 04

PROTECTION AGAINST IMMISSION.
APTIC-25638 02

AIR POLLUTION, PRE-EMPTION, LOCAL PROBLEMS AND THE CONSTITUTION--SOME PIGEONHOLES AND HATRACKS.
APTIC-25671 12

STATISTICAL ANALYSES
DISCUSSION OF 'A STATISTICAL APPROACH TO DESCRIBING VEHICULAR DRIVING CYCLES'. F. BECKLEY SMITH, JR., W. A. P. MEYER, AND R. U. AYRES, SAE PAPER NO. 690212.
APTIC-12771 06

A STATISITICAL STUDY ON VISIBILITY FORECASTING (PART I).
APTIC-22403 05

ESTIMATION OF THE ANNUAL AVERAGE OF PARTICLE FALL BY MONTHLY VALUES. TOTAL DUSTFALL AND DUSTFALL COMPONENTS.
APTIC-24738 03

SOME STATISTICAL ASPECTS OF LONG-TERM FLUCTUATIONS IN SOLAR AND ATMOSPHERIC PHENOMENA.
APTIC-24758 05

POSSIBILITY OF THE ANALYTICAL DETERMINATION OF DOSE-THRESHOLD VALUE RELATIONSHIPS.
APTIC-24832 07

REGRESSION USING 'HOCKEY STICK' FUNCTION.
APTIC-25625 07

STATISTICAL PROCESSING OF DATA GATHERED BY THE RESEARCH REACTOR OF THE METEOROLOGICAL STATION IN MUNICH.
APTIC-25645 05

RELATIONSHIP BETWEEN AIR POLLUTION AND ASTHMATIC DISEASES AMONG PRIMARY SCHOOL CHILDREN IN KITA-KYUSHU. PART I. STATISTICAL ANALYSIS BASED ON QUESTIONNAIRES.
APTIC-25739 07

ECOLOGICAL STATISTICAL STUDIES CONCERNING ENVIRONMENTAL POLLUTION AND CHRONIC DISEASE.
APTIC-25873 07

STEAM
CATALYTIC REACTION OF CARBON MONOXIDE WITH STEAM.
APTIC-25700 02

APPARATUS FOR CONTROL OF AIR POLLUTION.
APTIC-25910 02

STEAM PLANTS
DESULFURIZATION OF FLUE GASES- THE PRESENT SITUATION. PART I.
APTIC-24707 02

FORMATION AND THEIR PREVENTION OF ACID SMUTS AT OIL FIRED

BOILER.
APTIC-24817 02

MONITORING OF SO2 IN THE VICINITY OF COAL-FIRED POWER PLANTS -TVA EXPERIENCES.
APTIC-24913 04

AIR POLLUTION IN HOLLAND.
APTIC-24915 02

REMOVAL OF SULFUR DIOXIDE FROM POWER-PLANT STACK GASES.
APTIC-24916 02

OIL-FIRED AND COAL-FIRED 600-MW BOILER OF THE POWER PLANT AT LE HAVRE.
APTIC-25677 02

TVA AIR POLLUTION STUDIES PROGRAM.
APTIC-25815 05

SPECIAL FEATURES OF THE 14C MW TURBINE OF THE DUISBURG POWER PLANT.
APTIC-26237 01

STEEL
WATER PERMEABILITY OF RUST LAYER FORMED BY ATMOSPHERIC CORROSION.
APTIC-24671 09

SURVEY OF CORROSION AND ATMOSPHERIC POLLUTION IN AND AROUND SHEFFIELD.
APTIC-25848 09

STOMATA
CAN STOMATA PLAY A PART IN PROTECTING PLANTS AGAINST AIR POLLUTANTS
APTIC-25536 08

STORAGE
EFFECT OF COLD STORAGE ON THE FLUORIDE CONTENT OF ALFALFA.
APTIC-24886 03

STORAGE BATTERIES
PROSPECTS FOR ELECTRIC VEHICLES. A STUDY OF LOW-POLLUTION-POTENTIAL VEHICLES--ELECTRIC.
APTIC-26083 02

LUCAS BACK THE ZINC-AIR BATTERY.
APTIC-26140 02

STREETS
EFFECTS OF AIR POLLUTION ON ANIMALS EXPOSED TO STREET ATMOSPHERES IN DETROIT.
APTIC-24964 07

CARBON MONOXIDE IN TOWN AIR AN INTERIM REPORT.
APTIC-25799 04

RESEARCHES ON AUTO EXHAUST GAS POLLUTION AND TRAFFIC NOISES IN TOKUSHIMA CITY. PART I.
APTIC-26284 04

AN INTERIM REPORT ON THE INVESTIGATION OF PUBLIC NUISANCE BY LEAD.
APTIC-26310 04

SULFATES
WASTE GYPSUM INTO USEFUL PRODUCTS.
APTIC-24646 02

STUDIES ON THE REMOVAL OF SULFUR DIOXIDE FROM HOT FLUE GASES AS A MEASURE TO PREVENT AIR POLLUTION IV. RECOVERY OF FLUE GAS SULFUR AS AMMONIUM PHOSPHATE.
APTIC-24844 02

FERRIC SULPHATE AND SULPHURIC ACID FROM SULPHUR DIOXIDE AND AIR.
APTIC-26142 02

SULFIDES
THERMODYNAMIC ANALYSIS OF THE REDUCTION OF SULFUR DIOXIDE BY METAL SULFIDES WITH THE FORMATION OF ELEMENTAL SULFUR.
APTIC-24703 06

SULFITE PULPING
THE SCA-BILLERUD RECOVERY PROCESS.
APTIC-26171 02

SULFITES
PH VALUE OF AMMONIUM SULFITE-BISULFITE SOLUTIONS.
APTIC-24895 02

SULFUR COMPOUNDS
REACTIONS OF METAL NITRATES IN MOLTEN SULFUR.
APTIC-22814 01

RECOVERY OF SULPHUR.
APTIC-24576 02

EFFECT OF PARTICLE SIZE ON THE DETERMINATION OF INORGANIC SULFUR IN COAL.
APTIC-24725 03

SULPHUR COMPUNDS IN KRAFT PULP MILL EFFLUENTS.
APTIC-24902 01

THE WORLD SUPPLY OF SULFUR.
APTIC-24917 10

SULFUR IN IRON- AND STEELMAKING.
APTIC-24928 01

MODERN METHODS OF MONITORING GASEOUS PULP MILL EFFLUENTS FOR SULFUR COMPOUNDS.
APTIC-24939 03

TRAIL SOLVES ITS SULPHUR PROBLEM.
APTIC-25589 02

PRODUCTION OF SOUR GAS-SULFUR WELLS EMPLOYING A SULFUR SOLVENT.
APTIC-25708 02

QUANTITATIVE ANALYZER OF SULFUR CONTENTS.
APTIC-25911 03

ACTIVATION ANALYSIS OF AIRBORNE SELENIUM AS A POSSIBLE INDICATOR OF ATMOSPHERIC SULFUR POLLUTANTS.
APTIC-26069 03

SULFUR DIOXIDE
PRODUCTION OF CARBON DISULFIDE FROM METHANE AND SULFUR DIOXIDE.
APTIC-24596 06

ATMOSPHERIC CORROSION OF TALLIUM.
APTIC-24619 09

OXIDATION OF SULFUR DIOXIDE ON A VANADIUM CATALYST.
APTIC-24623 06

ONTARIO'S AIR POLLUTION INDEX.
APTIC-24635 04

DEPENDENCE OF SULFUR DIOXIDE ABSORPTION ON TEMPERATURE IN THE WEST-GAEKE METHOD.
APTIC-24652 03

PROPERTIES OF ELECTROLYTE FILMS IN ATMOSPHERIC CORROSION.
APTIC-24655 09

SOME EXAMPLES OF WIDE-AREA AIR POLLUTION IN LATE SPRING.
APTIC-24685 04

EYE IRRITATION FROM AIR POLLUTION.
APTIC-24710 07

PERFORMANCE OF A CONTINUOUS COLORIMETRIC AIR MONITOR.
APTIC-24720 03

REACTION OF TREES AND SHRUBBERY TO AIR POLLUTION IN THE FOREST-PARK BELT OF MOSCOW AND MEASURES FOR EXTENDING THE LIFESPAN OF PLANTS.
APTIC-24733 08

GAS RESISTANCE OF PINE AND BIRCH.
APTIC-24734 08

FLUE-GAS WASHING PROCESSES. PART THREE.
APTIC-24737 02

HYDROGEN SULFIDE FROM SULFUR DIOXIDE AND METHANE.
APTIC-24739 06

REACTION OF SO2 WITH POLYMER.
APTIC-24742 09

PRINCIPAL AGENTS OF POLLUTION AND THEIR RATE OF DISPERSAL.
APTIC-24776 04

COMPARISON OF THE EFFECTS OF SULPHUR DIOXIDE AND OF THE DERIVATIVES OF FLUORINE ON A FEW PLANTS.
APTIC-24852 08

SOME PECULIARITIES OF THE SUSCEPTIBILITY OF SCOTCH PINE TO SULFUR DIOXIDE INJURY.
APTIC-24853 08

THE EFFECT OF INDUSTRIAL GASES AND INDUSTRIAL SMOKE ON VARIOUS FOREST SPECIES.
APTIC-24866 08

FLUORESCENCE AND PHOSPHORESCENCE OF SO2 VAPOR.
APTIC-24894 06

SIMULTANEOUS DETERMINATION OF CARBON AND SULFUR IN ORGANIC COMPOUNDS BY GAS CHROMATOGRAPHY.
APTIC-24901 03

MONITORING OF SO2 IN THE VICINITY OF COAL-FIRED POWER PLANTS -TVA EXPERIENCES.
APTIC-24913 04

INFORMATION ON DAMAGE CAUSED BY AIR POLLUTION TO THE PLANTS AND ANIMALS IN EUROPEAN COUNTRIES.
APTIC-24933 08

EFFECTS ON CANINE PULMONARY FUNCTION VIA INDUCED NO2 IMPAIRMENT, PARTICULATE INTERACTION, AND SUBSEQUENT SOX.
APTIC-24940 07

CAN STOMATA PLAY A PART IN PROTECTING PLANTS AGAINST AIR POLLUTANTS
APTIC-25536 08

APPARATUS FOR CONTINUOUSLY MEASURING THE CONCENTRATION OF A GAS-MIXTURE COMPONENT.
APTIC-25637 03

THE EFFECT OF PLANTS OF A COMBINATION OF SUBACUTE AND TOXIC SULFUR DIOXIDE DOSES.
APTIC-25662 08

SOLUBILITY OF SULPHUR DIOXIDE IN SATURATED MAGNESIUM BISULPHITE SOLUTION   TAPPI DATA SHEET 164 SOLUBILITY OF SULPHUR DIOXIDE IN SATURATED MAGNESIUM BISULPHITE SOLUTION TAPPI DATA SHEET 165 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 5 C   TAPPI DATA SHEET 166 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 15 C   TAPPI DATA SHEET 167 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 25 C TAPPI DATA SHEET 168 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 35 C   TAPPI DATA SHEET 169 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 50 C   TAPPI DATA SHEET 170 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 60 C TAPPI DATA SHEET 171.
APTIC-25672 06

OIL-FIRED AND COAL-FIRED 600-MW BOILER OF THE POWER PLANT AT LE HAVRE.
APTIC-25677 02

FINDINGS OF PFR ON SO2 HIGH SENSITIVE SCHOOL CHILDREN.
APTIC-25740 07

SULFUR DIOXIDE.
APTIC-25751 07

A STUDY OF THE EFFECTS OF AIR POLLUTANTS ON THE EYE.
APTIC-25756 07

SULFUR DIOXIDE.
APTIC-25761 06

AIR POLLUTION AND SOUTHERN FORESTS.
APTIC-25769 08

A COMPARISON OF THE EFFECT ON RAYON FABRICS OF VARIOUS GASES UNDER CONTROLLED CONDITIONS.
APTIC-25772 09

TIME CONSTANT OF A THOMAS AUTOMETER AND SIGNIFICANCE OF INDICATED RESPONSE.
APTIC-25777 03

FEATURES OF A COMBINED ACTION OF SULFUROUS GAS AND CARBON MONOXIDE IN THEIR JOINT PRESENCE IN THE ATMOSPHERE.
APTIC-25790 07

SULFUR DIOXIDE.
APTIC-25808 02

POSSIBLE LONG TERM EFFECTS OF EXPOSURE TO SULPHUR DIOXIDE.
APTIC-25846 07

SURVEY OF CORROSION AND ATMOSPHERIC POLLUTION IN AND AROUND SHEFFIELD.
APTIC-25848 09

LOW-VELOCITY GAS-LIQUID IMPINGER FOR THE CONTINUOUS ESTIMATION OF SULPHUR DIOXIDE AND OTHER ATMOSPHERIC POLLUTANTS.
APTIC-25851 03

SENSITIVITY OF GRAPEVINES TO INJURY BY ATMOSPHERIC SULFUR DIOXIDE.
APTIC-25888 08

PREPARATION OF RADIOACTIVE SULFUR DIOXIDE FROM BARIUM SULFATE.
APTIC-25929 06

TRENDS IN THE UTILIZATION OF THE MOST IMPORTANT FORMS OF SULFUR-CONTAINING RAW MATERIAL.
APTIC-25938 02

THE THERMODYNAMIC PROPERTIES OF SULFUR DIOXIDE.
APTIC-25954 06

ON THE AIR POLLUTION BY RED OCHRE FACTORIES IN MITSU-CHO. OKAYAMA PREFECTURE, JAPAN.
APTIC-26029 04

STUDIES ON THE RELATIONSHIP BETWEEN AIR POLLUTION AND INFANTILE ASTHMA ATTACKS. USING THE SO2 CONCENTRATION IN THE AIR AS AN INDICATOR.
APTIC-26051 07

ABOUT SULFUR DIOXIDE AND DIMETHYLANILINE.
APTIC-26091 06

AIR POLLUTION   SMOKE AND SO2.
APTIC-26094 04

SOME OBSERVATIONS ON ANIMALS EXPOSED TO AIR POLLUTANTS ESPECIALLY SULPHUR OXIDES.
APTIC-26116 07

THE EFFECT OF O3, NO2, AND SO2 EXPOSURE ON THE EXPERIMENTAL ASTHMA IN GUINEAPIGS.
APTIC-26117 07

A NEW DEVICE FOR CONTINUOUS DETERMINATION OF SULFUR DIOXIDE.
APTIC-26120 03

DISTURBANCE OF ACID-BASE AND ENZYME EQUILIBRIUM IN EXPERIMENTAL INTOXICATION WITH SO2 AND PROTECTIVE ACTION OF AMMONIA.
APTIC-26138 07

FERRIC SULPHATE AND SULPHURIC ACID FROM SULPHUR DIOXIDE AND AIR.
APTIC-26142 02

AN ARTICLE DEALING WITH SULFUR DIOXIDE EMISSIONS AND THEIR EFFECTS ON VEGETATION.
APTIC-26174 08

SULFUR DIOXIDE, SULFURIC ACID AEROSOL AND VISIBILITY IN LOS ANGELES.
APTIC-26216 04

A 'PERSONAL' MEASURING INSTRUMENT FOR ATMOSPHERIC SULPHUR DIOXIDE.
APTIC-26257 03

ON AIR POLLUTION OF MITSUISHI-TOWN, BIZEN-TOWN AND TAMANO-CITY, OKAYAMA PREFECTURE.
APTIC-26288 04

ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE. (II).
APTIC-26302 04

ACTUAL REPORT OF INFLUENCE OF AIR POLLUTION ON THE BODIES.
APTIC-26306 07

SULFUR DIOXIE
  AIR HUMIDITY AND BRUSH CONTACT DROP   THE EFFECT OF WATER VAPOR, SULFUR DIOXIDE, AND HYDROGEN SULFIDE.
  APTIC-24943 09

SULFUR OXIDES
  CHEMICAL ENGINEERING METHODS FOR REMOVING INORGANIC EMISSIONS.
  APTIC-24756 02

  ON THE INVESTIGATION OF PUBLIC NUISANCE IN AJIMANO AREA, TAKEFU CITY.
  APTIC-26028 04

  REPORT ON THE STUDY OF AIR POLLUTION IN NISHIYODOGAWA WARD.
  APTIC-26031 04

  COMPLEXOMETRIC DETERMINATION OF SULFUR TRIOXIDE AND SULFUR DIOXIDE IN WASTE PROCESS GASES.
  APTIC-26067 03

  SURVEY OF ACTUAL CONDITIONS OF AIR POLLUTION. 1. AIR POLLUTION IN KEIHIN INDUSTRIAL AREA (1).
  APTIC-26130 04

  PROCESS FOR REMOVING SULPHUR DIOXIDE FROM A GAS.
  APTIC-26272 02

SULFUR OXIDES CONTROL
  PRESENT STATUS OF DESULFURIZATION TECHNIQUE (1).
  APTIC-22180 02

  PROBLEMS SET BY ATMOSPHERIC POLLUTION IN JAPAN.
  APTIC-24826 01

  CRUDE OIL FUELS TWO 375-MW UNITS IN JAPAN.
  APTIC-25690 01

SULFUR TRIOXIDE
  THE AMOUNT OF SULPHUR TRIOXIDE ACCUMULATED ON FIBRE-GLASS FILTERS USED FOR DETERMINING DUST CONTENT IN FLUE GASES.
  APTIC-24584 03

  DEVELOPMENT AND TESTING, WITH STANDARDIZED MIXTURES AND ON A VAPOR GENERATOR, OF AN INSTRUMENT FOR MEASURING SO3 IN COMBUSTION PRODUCTS.
  APTIC-24879 03

  APPARATUS FOR CONTINUOUSLY MEASURING THE CONCENTRATION OF A GAS-MIXTURE COMPONENT.
  APTIC-25637 03

  MEASUREMENT OF THE SULFUR TRIOXIDE CONTENT OF THE AIR.
  APTIC-25854 03

  A METHOD FOR THE ESTIMATION OF SULPHUR TRIOXIDE.
  APTIC-25940 03

  ON THE AIR POLLUTION BY RED OCHRE FACTORIES IN MITSU-CHO. OKAYAMA PREFECTURE, JAPAN.
  APTIC-26029 04

  EFFECT OF AIR POLLUTION ON TREES. 3. ANALYSIS AND FRACTIONATION OF SULFUR IN THE LEAVES OF STREET TREES.
  APTIC-26078 08

  STUDIES ON PUBLIC NUISANCE CAUSED BY AIR POLLUTION. 2. AIR POLLUTION IN TAJIMI CITY.
  APTIC-26289 04

SULFURIC ACID
  TWO-STAGE MIST ELIMINATORS FOR SULFURIC ACID PLANTS.
  APTIC-24833 02

  DETERMINATION OF SMALL AMOUNTS OF SULFURIC ACID IN THE ATMOSPHERE.
  APTIC-24874 04

SULFUROUS ACID
  DISPOSAL METHOD FOR SULFUROUS ACID CONTAINED IN WASTE GAS.
  APTIC-24643 02

SULFURYL FLUORIDE
  VOLUMETRIC DETERMINATION OF CONCENTRATIONS OF SULFURYL FLUORIDE IN AIR.
  APTIC-26203 03

SURFACE COATINGS
ATMOSPHERIC CORROSION OF ZINC- AND CADMIUM-COATED STEEL AND THE COEFFICIENTS FOR RECALCULATING THE RESULTS OF ACCELERATED CORROSION TESTS INTO DATA FOR SERVICE CONDITIONS.
APTIC-24972 09

THE CONTROL OF ORGANIC SOLVENTS.
APTIC-25592 01

SURFACE PROPERTIES
SEDIMENTATION OF POWDERED SOLIDS.
APTIC-24973 06

EFFECT OF IN VITRO EXPOSURE TO 03 ON SURFACE TENSION OF LUNG EXTRACT.
APTIC-26115 07

SURFACTANTS
EFFECT OF SURFACE-ACTIVE AGENTS ON THE RATE OF ABSORPTION.
APTIC-24790 06

SUSPENDED PARTICULATES
ABSTRACTS OF PAPERS ON INDOOR AIR POLLUTION (SUSPENDED PARTICULATES) CONTROL IN ARCHITECTURE. PART I.
APTIC-24684 03

GAS DYNAMICS OF ACCELERATING PARTICULATE FLOW IN CIRCULAR DUCTS.
APTIC-24726 06

A STUDY OF THE MECHANICS OF TURBULENT GAS-SOLID SHEAR FLOWS.
APTIC-25657 06

THE THERMAL FORCE IN THE TRANSITION REGION.
APTIC-25832 06

ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE. (II).
APTIC-26302 04

SWEDEN
AIR POLLUTION PROBLEMS IN THE WOOD PRODUCTS INDUSTRY.
APTIC-25683 01

SWITCHES
PRESSURE DIFFERENTIAL SWITCHES OR REGULATORS FOR THE OPENING AND CLOSING OF ELECTRICAL CONTACTS.
APTIC-24595 06

SWITZERLAND
REPORT ON THE STATE OF AIR POLLUTION IN SWITZERLAND.
APTIC-26135 12

SYNERGISM
THE JOINT ACTION OF ATMOSPHERIC POLLUTIONS ON MAN.
APTIC-24688 07

SCIENTIFIC AND PRACTICAL MEANS OF STUDYING THE JOINT ACTION OF SMALL CONCENTRATIONS OF TOXIC SUBSTANCES IN THE AIR.
APTIC-24692 07

FEATURES OF A COMBINED ACTION OF SULFUROUS GAS AND CARBON MONOXIDE IN THEIR JOINT PRESENCE IN THE ATMOSPHERE.
APTIC-25790 07

PATHOBIOLOGY OF AIR POLLUTANTS.
APTIC-25971 07

SYNTHETIC FIBERS
GAS FADING OF ACETATE AND TRIACETATE PRINTS.
APTIC-24781 09

ADVANCES IN THEORETICAL AND PRACTICAL STUDIES OF GAS FADING.
APTIC-24965 09

A COMPARISON OF THE EFFECT ON RAYON FABRICS OF VARIOUS GASES UNDER CONTROLLED CONDITIONS.
APTIC-25772 09

TAJIMI
STUDIES ON PUBLIC NUISANCE CAUSED BY AIR POLLUTION. 2. AIR POLLUTION IN TAJIMI CITY.
APTIC-26289 04

TAKEFU
ON THE INVESTIGATION OF PUBLIC NUISANCE IN AJIMANO AREA, TAKEFU CITY.
APTIC-26028 04

TAXATION
AUTOMOTIVE POLLUTION CONTROL.
APTIC-23390 12

TECHNICAL SOCIETIES
AIR POLLUTION IN THE UNITED STATES.
APTIC-26090 12

TECHNOLOGY ASSESSMENT
THE RELATIONSHIP OF TECHNOLOGY ASSESSMENT TO ENVIRONMENTAL MANAGEMENT.
APTIC-25782 12

TEETH
THE CHEMISTRY, HISTOLOGY, AND ROENTGENOLOGY OF THE TEETH AND BONES OF LARGE ANIMALS.
APTIC-25945 08

TEMPERATURE
TEMPERATURE AS A FACTOR IN DETERMINING ORDER OF ELUTION IN GAS-LIQUID CHROMATOGRAPHY OF SOME C5-C8 HYDROCARBONS.
APTIC-24587 03

DEPENDENCE OF SULFUR DIOXIDE ABSORPTION ON TEMPERATURE IN THE WEST-GAEKE METHOD.
APTIC-24652 03

THE NEW 'HOT' ELECTROSTATIC PRECIPITATOR.
APTIC-24675 02

TEMPERATURE CHARACTERISTICS OF FIBRE FILTERS.
APTIC-25798 02

THE EFFECT OF HEAT TREATMENT ON THE STRUCTURE OF KAOLIN AND ITS IN VITRO HEMOLYTIC ACTIVITY.
APTIC-25891 07

THE EVALUATION OF THE IGNITION TEMPERATURE OF ACTIVATED CHARCOALS IN AIR, STEAM, OXYGEN AND OXIDES OF NITROGEN.
APTIC-26220 02

TEMPERATURE GRADIENT
THE THERMAL FORCE IN THE TRANSITION REGION.
APTIC-25832 06

TEMPERATURE SENSING INSTRUMENTS
GAS TESTING PROCESS FOR SMOG FORMING CONSTITUTENTS.
APTIC-25734 03

TEMPERATURE (ATMOSPHERIC)
FINDINGS OF PFR ON SO2 HIGH SENSITIVE SCHOOL CHILDREN.
APTIC-25740 07

AUTOMOTIVE STARTING AND WARM-UP RESPOND TO GASOLINE VOLATILITY.
APTIC-25931 01

TENSILE STRENGTH
THE EFFECT OF AIR POLLUTANTS ON COTTON.
APTIC-24899 09

TESTING FACILITIES
OZONE CHEMILUMINESCENT STUDY. FINAL REPORT. PART II. RADIOACTIVE OZONE GENERATOR.
APTIC-26082 03

TETRAETHYL LEAD
ALTERNATING CURRENT POLAROGRAPHIC ANALYSIS OF LEAD IN AUTOMOBILE EXHAUST GAS.
APTIC-24617 03

RAPID ANALYSIS OF LEAD IN AUTOMOBILE EXHAUST GAS.
APTIC-24618 03

APTIC-24618 03

EFFECT OF TETRAETHYLLEAD ON PREFLAME REACTIONS IN AN ENGINE.
APTIC-24718 01

FLAME PHOTOMETRIC DETERMINATION OF LEAD AND MANGANESE IN GASOLINE.
APTIC-24719 03

BIOCHEMICAL STUDIES ON THE TOXICITY OF TETRAETHYL LEAD AND OTHER ORGANO-LEAD COMPOUNDS.
APTIC-25847 07

AIR SAMPLING AND ANALYSIS OF LEAD ON PAPER.
APTIC-25949 03

ICE NUCLEI FROM DIRECT REACTION OF IODINE VAPOR WITH VAPORS FROM LEADED GASOLINE.
APTIC-26191 01

BIOGEOCHEMICAL IMPLICATIONS OF LEAD IN THE HYDROSPHERE.
APTIC-26224 08

IMPROVED PROCEDURE FOR PURIFYING THE EXHAUST OF INTERNAL COMBUSTION MOTORS.
APTIC-26243 02

TETRAMETHYL LEAD
TETRAMETHYLLEAD AS SUBSTITUTE FOR TETRAETHYLLEAD.
APTIC-25984 07

TEXAS
DISTRIBUTION OF FUNGAL SPORE TYPES IN SELECTED AREAS IN TEXAS.
APTIC-12613 01

TEXTILE MANUFACTURING
CARBON DISULFIDE--HYDROGEN SULFIDE BALANCE IN THE PRODUCTION OF VISCOSE TEXTILE FIBERS.
APTIC-25791 02

TEXTILES
EFFECT OF ATMOSPHERIC CONTAMINANTS ON LIGHTFASTNESS TESTING.
APTIC-24906 09

THALLIUM
ATMOSPHERIC CORROSION OF TALLIUM.
APTIC-24619 09

THE NETHERLANDS
ATMOSPHERIC POLLUTION IN THE USA EXPERIENCES GAINED DURING A STUDY TOUR. TECHNICAL ASPECTS.
APTIC-24639 03

TERMINOLOGY AND UNITS OF MEASURE.
APTIC-25629 14

THERMAL RADIATION
STUDIES ON THE COMBINED EFFECTS OF OZONE AND A HOT

ENVIRONMENT ON REACTION TIME IN SUBHUMAN PRIMATES.
APTIC-25579 07

USE OF THERMODESORPTION TECHNIQUE FOR STUDYING GAS ADSORPTION CARBON MONOXIDE ON NICKEL.
APTIC-25866 06

THERMOCHEMICAL STRENGTH GLASS FABRICS
THERMOCHEMICAL STRENGTH OF GLASS FIBER USED IN BAG FILTERS.
APTIC-24878 02

THERMODYNAMICS
MASS AND MOMENTUM EQUATIONS OF ISOTHERMAL NON-ISOBARIC GAS-LIQUID PHASE REACTIONS. III.
APTIC-12835 06

THERMODYNAMIC CONSIDERATIONS IN THE INTERACTIONS OF NITROGEN OXIDES AND OXY-ACIDS IN THE ATMOSPHERE.
APTIC-24015 05

THERMODYNAMIC ANALYSIS OF THE REDUCTION OF SULFUR DIOXIDE BY METAL SULFIDES WITH THE FORMATION OF ELEMENTAL SULFUR.
APTIC-24703 06

A REACTION WHICH PERMITS THE CYCLIC USE OF CALCINED DOLOMITE TO DESULFURIZE FUELS UNDERGOING GASIFICATION.
APTIC-24762 02

THE EQUILIBRIUM FLOW OF A GAS-PARTICLE SYSTEM.
APTIC-24860 06

THE FORMATION AND DECOMPOSITION REACTIONS OF THE ACETYL RADICAL AND THE HEAT OF FORMATION OF THE ACETYL RADICAL.
APTIC-25828 06

THE THERMODYNAMIC PROPERTIES OF SULFUR DIOXIDE.
APTIC-25954 06

THERMODYNAMIC FUNCTIONS FOR NITROGEN DIOXIDE AND NITROUS ACID.
APTIC-25958 06

ABOUT SULFUR DIOXIDE AND DIMETHYLANILINE.
APTIC-26091 06

THIN-LAYER CHROMATOGRAPHY
STUDY OF THE ATMOSPHERIC POLYCYCLIC HYDROCARBONS. I. PROBLEMS CONNECTED WITH THE COUPLING OF THIN-LAYER CHROMATOGRAPHY AND GAS CHROMATOGRAPHY.
APTIC-24705 03

THOMAS AUTOMETER
TIME CONSTANT OF A THOMAS AUTOMETER AND SIGNIFICANCE OF INDICATED RESPONSE.
APTIC-25777 03

THRESHOLDS
PREDICTING HUMAN PERFORMANCE IN SPACE ENVIRONMENTS.
APTIC-12612 07

POSSIBILITY OF THE ANALYTICAL DETERMINATION OF DOSE-THRESHOLD VALUE RELATIONSHIPS.
APTIC-24832 07

REGRESSION USING 'HOCKEY STICK' FUNCTION.
APTIC-25625 07

THE TOXICOLOGICAL BASIS OF THRESHOLD LIMIT VALUES 1. EXPERIENCE WITH THRESHOLD LIMIT VALUES BASED ON ANIMAL DATA.
APTIC-25917 11

THRESHOLD LIMIT VALUES FOR CARBON MONOXIDE.
APTIC-26103 11

BIOGEOCHEMICAL IMPLICATIONS OF LEAD IN THE HYDROSPHERE.
APTIC-26224 08

THE TOXICOLOGICAL BASIS OF THRESHOLD LIMIT VALUES 5. THE EXPERIMENTAL INHALATION OF VAPOR MIXTURES BY RATS, WITH NOTES UPON THE RELATIONSHIP BETWEEN SINGLE DOSE INHALATION AND SINGLE DOSE ORAL DAT
APTIC-26270 07

THROTTLING
EXHAUST BACK PRESSURE CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE.
APTIC-23821 02

TIME CONSTANT
TIME CONSTANT OF A THOMAS AUTOMETER AND SIGNIFICANCE OF INDICATED RESPONSE.
APTIC-25777 03

TIMED FUEL INJECTION
A PROCEDURE FOR THE SPECIFICATION OF DISTRIBUTOR PUMPS FOR HIGH VOLUME PRODUCTION.
APTIC-25923 02

EXHAUST EMISSION CONTROL BY FUEL INJECTION THE VW 1600 WITH ELECTRONICALLY CONTROLLED FUEL INJECTION SYSTEM.
APTIC-26147 02

TIRES
REMOVABLE PROTECTIVE BAND OR BANDAGE FOR TIRE INNER TUBES.
APTIC-25646 06

TISSUES
CARBON MONOXIDE PARTIAL PRESSURE IN TISSUE OF DIFFERENT ANIMALS.
APTIC-25562 07

THE EFFECT OF CARBON MONOXIDE ON TISSUE RESPIRATION. CHRONIC CARBON MONOXIDE POISONING SERIES VI.
APTIC-25800 07

THE EFFECTS OF THE ABSORPTION OF FLUORIDE. V. THE CHEMICAL DETERMINATION OF FLUORIDE IN HUMAN SOFT TISSUES FOLLOWING PROLONGED INGESTION OF FLUORIDE AT VARIOUS LEVELS.
APTIC-25946 07

TOBACCO
NEW DUST REMOVAL METHODS IN THE TOBACCO INDUSTRY.
APTIC-25588 02

TOKUSHIMA
RESEARCHES ON AUTO EXHAUST GAS POLLUTION AND TRAFFIC NOISES IN TOKUSHIMA CITY. PART I.
APTIC-26284 04

TOKUSHIMA PREFECTURE
PRELIMINARY SURVEY OF THE AIR POLLUTION IN TOKUSHIMA PREFECTURE, PART VII.
APTIC-26036 04

TOKUYAMA
AIR POLLUTION.
APTIC-26290 04

TOKYO
SOME EXAMPLES OF WIDE-AREA AIR POLLUTION IN LATE SPRING.
APTIC-24685 04

RECENT RICKETS IN INFANTS OF TOKYO METROPOLIS.
APTIC-26034 07

AN OUTLINE OF THE RESULTS OF AIR POLLUTION MEASUREMENTS IN THREE PLACES IN TOKYO.
APTIC-26042 04

AN URBAN-CLIMATOLOGICAL STUDY OF THE ATTENUATION OF SOLAR RADIATION BY AIR POLLUTION IN TOKYO.
APTIC-26059 05

TOMATOES
COMPARISON OF THE EFFECTS OF SULPHUR DIOXIDE AND OF THE DERIVATIVES OF FLUORINE ON A FEW PLANTS.
APTIC-24852 08

TOPOGRAPHIC INTERACTIONS
INFLUENCE OF CLIMATE AND TOPOGRAPHY ON OXIDANT AIR POLLUTION CONCENTRATIONS THAT DAMAGE CONIFER FORESTS IN SOUTHERN CALIFORNIA.
APTIC-25792 05

REGARDING THE EFFECT OF PHYSICOGEOGRAPHIC CONDITIONS ON THE CONCENTRATION OF INDUSTRIAL EMISSIONS INTO THE ATMOSPHERE.
APTIC-25813 05

ON THE AIR POLLUTION BY RED OCHRE FACTORIES IN NITSU-CHO. OKAYAMA PREFECTURE, JAPAN.
APTIC-26029 04

TORONTO
AIR QUALITY MODEL SIMULATES TORONTO SKIES.
APTIC-25537 05

TOXIC TOLERANCES
GAS RESISTANCE OF PINE AND BIRCH.
APTIC-24738 08

SULPHUR COMPOUNDS IN KRAFT PULP MILL EFFLUENTS.
APTIC-24902 01

TOXICOLOGICAL STUDIES ON HYDROCARBONS. IX. THE ASPIRATION HAZARD AND TOXICITY OF HYDROCARBONS AND HYDROCARBON MIXTURES.
APTIC-25640 07

TOXICITY
TOXICOLOGIC ASPECTS OF FLAMMABILITY AND COMBUSTION OF POLYMERIC MATERIALS.
APTIC-24153 07

THE JOINT ACTION OF ATMOSPHERIC POLLUTIONS ON MAN.
APTIC-24688 07

SCIENTIFIC AND PRACTICAL MEANS OF STUDYING THE JOINT ACTION OF SMALL CONCENTRATIONS OF TOXIC SUBSTANCES IN THE AIR.
APTIC-24692 07

PROPERTIES OF OZONE AS AN INDUSTRIAL POISON.
APTIC-24781 07

LEVELS OF TOXICITY TO ANIMALS PROVIDE SOUND BASIS FOR FLUORIDE STANDARDS.
APTIC-24944 08

MOTOR FUMES AND ATMOSPHERIC POLLUTION.
APTIC-24961 07

RELATIONSHIP OF RESULTS OF LONG-TERM TOXICITY STUDIES TO THOSE OF SHORTER DURATION.
APTIC-24963 03

ANIMAL EXPERIMENT INVESTIGATIONS OF CHRONIC CARBON DISULFIDE POISONING.
APTIC-25567 07

NEUROLOGIC MANIFESTATIONS OF CHRONIC CARBON MONOXIDE POISONING.
APTIC-25695 07

TOXICITY OF OZONIZED AIR TO A VARIETY OF MICROORGANISMS.
APTIC-25690 08

METALLIC MENACE IN THE ENVIRONMENT.
APTIC-25705 07

EFFECTS OF CERTAIN CHEMICAL SUBSTANCES ON PROTEIN CONTENT OF BLOOD SERUM AND OF BONE MARROW.
APTIC-25730 07

EXTENSIVE PULMONARY CHANGES IN AN APPARENTLY LIGHT NITROGEN OXIDES POISONING.
APTIC-25747 07

FEATURES OF A COMBINED ACTION OF SULFUROUS GAS AND CARBON MONOXIDE IN THEIR JOINT PRESENCE IN THE ATMOSPHERE.
APTIC-25790 07

EXPERIMENTAL CARBON MONOXIDE POISONING ITS ELECTROPHYSIOLOGICAL EFFECTS ON THE VISUAL PATHWAY IN CATS.
APTIC-25836 07

BIOCHEMICAL STUDIES ON THE TOXICITY OF TETRAETHYL LEAD AND OTHER ORGANO-LEAD COMPOUNDS.
APTIC-25867 07

PERMANENT DAMAGE TO THE NERVOUS SYSTEM CAUSED BY CARBON MONOXIDE POISONING OF A FETUS.
APTIC-26160 07

TOXICITY OF OZONE. II. EFFECT OF OXYGEN AND CARBON DIOXIDE UPON ACUTE TOXICITY.
APTIC-26188 07

TOXICITY OF OZONE. IV. SILICONE AEROSOLS AND ALCOHOL VAPOR THERAPY IN OZONE POISONING.
APTIC-26217 07

TOXICOLOGICAL ASPECTS OF ATMOSPHERIC NITROGEN OXIDES.
APTIC-26271 07

TASKS AND PROBLEMS OF INDUSTRIAL TOXICOLOGY FROM THE VIEWPOINT OF TECHNICAL CHEMISTRY.
APTIC-26274 07

TRACE ANALYSIS
FEASIBILITY OF TUNNEL DETECTION BY TRACE GAS ANALYSIS.
APTIC-24577 03

AUTHOR'S REPLY TO THE PRECEDING DISCUSSION.
APTIC-24776 05

TRACERS
DEVELOPMENT OF A LASER SYSTEM FOR ABSOLUTE ATMOSPHERIC DIFFUSION MEASUREMENT OF A GASEOUS TRACER MATERIAL. (FINAL REPORT).
APTIC-25936 03

A TRACER TECHNIQUE TO MEASURE DEPOSITION OF STACK EMISSIONS.
APTIC-26139 03

FLUORESCENT PARTICLES AND THEIR USE IN STUDYING AIR MOTION.
APTIC-26190 05

TRACHEA
INTRATRACHEAL ADMINISTRATION OF DUST PARTICLES AND CARCINOGENS IN RATS.
APTIC-26099 07

TRANSFER VALUES
TRANSFER VALUES OF CARBON MONOXIDE IN NORMAL HUMANS IN A STABLE VENTILATION STATE AT REST.
APTIC-24931 06

TRANSPORT
DEVELOPMENT OF AN ATMOSPHERIC TRANSPORT MODEL.
APTIC-24606 05

DUST IN THE CARIBBEAN ATMOSPHERE TRACED TO AN AFRICAN DUST STORM.
APTIC-24632 05

ATMOSPHERIC PHYSICS. ATMOSPHERIC DIFFUSION, DEPOSITION, AND TRANSPORT. (ANNUAL REPORT).
APTIC-24962 05

THE MAXIMA OF SUTTON'S EQUATION CORRECTED FOR DEPOSITION.
APTIC-25469 05

A STUDY OF THE POSSIBLE MOVEMENT OF MICROORGANISMS THROUGH SMALL ORIFICES. (FINAL REPORT).
APTIC-25687 06

THE DYNAMIC BEHAVIOR OF AEROSOLS.
APTIC-25779 06

THE GLOBAL CIRCULATION OF ATMOSPHERIC POLLUTANTS.
APTIC-25907 05

TRANSPORTATION
LNG PIPELINES - A STATUS SURVEY.
APTIC-25697 02

TRAPPING (SAMPLING)
CHEMISTRY OF SMELL.
APTIC-24818 03

TREES
CHARACTERISTICS OF PHOTOSYNTHESIS AND OF SOME OTHER PROCESSES IN CONNECTION WITH SMOKE AND GAS RESISTANCE OF TREES AND SHRUBS.
APTIC-24593 08

GAS RESISTANCE OF PINE AND BIRCH.
APTIC-24738 08

THE EFFECT OF SPECIFIC INDUSTRIAL GASES ON THE GROWTH OF SOME TREE SPECIES.
APTIC-24864 08

THE INFLUENCE OF SMOKE AND GAS ON THE FLOWERING AND FRUITING OF SOME TREES AND SHRUBS.
APTIC-24865 08

AIR POLLUTION AND SOUTHERN FORESTS.
APTIC-25769 08

TRENDS
INDUSTRY, ENVIRONMENT AND ENVIRONMENTAL PROTECTION.
APTIC-25541 12

TRENDS IN THE UTILIZATION OF THE MOST IMPORTANT FORMS OF SULFUR-CONTAINING RAW MATERIAL.
APTIC-25938 02

ECONOMIC PROJECTIONS FOR AIR QUALITY CONTROL REGIONS.
APTIC-25993 10

A REVIEW AND COMPARISON OF SELECTED UNITED STATES ENERGY FORECASTS.
APTIC-26085 01

TRIPLET SULFUR DIOXIDE
A STUDY OF THE DECAY PROCESSES IN THE TRIPLET SULFUR DIOXIDE MOLECULE EXCITED AT 3828.8 A.
APTIC-26152 06

THE DECAY MECHANISM OF TRIPLET SULFUR DIOXIDE MOLECULES FORMED BY INTERSYSTEM CROSSING IN THE FLASH PHOTOLYSIS OF SO2 (2400-3200 A).
APTIC-26154 06

TUMORS
INTRATRACHEAL ADMINISTRATION OF DUST PARTICLES AND CARCINOGENS IN RATS.
APTIC-26099 07

TUNNELS
FEASIBILITY OF TUNNEL DETECTION BY TRACE GAS ANALYSIS.
APTIC-24577 03

AIR POLLUTION AND ASSOCIATED HEALTH HAZARDS FROM DIESEL LOCOMOTIVE TRAFFIC IN A RAILWAY TUNNEL.
APTIC-26262 01

TURBIDIMETRY
TECHNIQUES FOR DETERMINING THE TURBIDITY OF THE ATMOSPHERE.
APTIC-25959 03

TURBIDITY
ATMOSPHERIC TURBIDITY OVER THE UNITED STATES, 1961-1966.
APTIC-12595 05

TURBULENCE ATMOSPHERIC
AN ANALYSIS OF TURBULENCE STATISTICS AT FORT WAYNE, INDIANA.
APTIC-25916 05

TURBULENCE (ATMOSPHERIC)
WIND DIRECTION, VELOCITY AND TURBULENCE INSTRUMENTATION FOR AIR POLLUTION DIAGNOSIS.
APTIC-24862 03

DEPENDENCE BETWEEN THE CONCENTRATION OF AEROSOLS AND THE INTENSITY OF TURBULENT INTERCHANGE IN LOWER ATMOSPHERE.
APTIC-24904 05

DIFFUSION IN ANISOTROPIC FIELD OF TURBULENCE.
APTIC-25755 05

TRANSVERSE JET PLUME. (TECHNICAL PROGRESS REPORT).
APTIC-25831 05

INVESTIGATION OF ATMOSPHERIC TURBULENCE BY MEANS OF THE M-27 BRIDLED-CUP ANEMOMETER.
APTIC-25978 05

ULTRAVIOLET RADIATION
AEROSOL FORMATION FROM GASEOUS AIR POLLUTANTS.
APTIC-24921 05

ULTRAVIOLET SPECTROMETRY
EFFECT OF TETRAETHYLLEAD ON PREFLAME REACTIONS IN AN ENGINE.
APTIC-24718 01

BIBLIOGRAPHICAL STUDY OF THE ABSORBENT PROPERTIES OF OZONE IN THE ULTRAVIOLET RANGE.
APTIC-25788 05

ULTRAVIOLET ABSORPTION OF ALIPHATIC NITRO COMPOUNDS IN THE PRESENCE OF A BASE.
APTIC-25948 03

ELECTRONIC ABSORPTION SPECTRA OF INORGANIC AND ORGANIC COMPOUNDS OF NITROGEN. I. NITROGEN DIOXIDE-DINITROGEN TETROXIDE IN SOLUTION.
APTIC-26253 06

UNITED STATES
ATMOSPHERIC TURBIDITY OVER THE UNITED STATES, 1961-1966.
APTIC-12595 05

THE CALIFORNIA TEST. FIGHT AGAINST AIR POLLUTION BY MEANS

OF CONTROL MEASURES APPLICABLE TO NEW AUTOMOBILES IN THE
U.S.A.
APTIC-24859 12

RESEARCH AND DEVELOPMENT OF AIR POLLUTION CONTROL TECHNOLOGY
IN THE UNITED STATES. PART II.
APTIC-25095 02

AIR POLLUTION ALONG THE MEXICAN-AMERICAN FRONTIER.
APTIC-26299 01

URBAN AREAS
PRINCIPAL AGENTS OF POLLUTION AND THEIR RATE OF DISPERSAL.
APTIC-24776 04

THE SHARE OF AUTOMOBILE EXHAUST GASES IN AIR POLLUTION.
APTIC-24783 01

SINGLET MOLECULAR OXYGEN AND THE PHOTOCHEMISTRY OF URBAN
ATMOSPHERES.
APTIC-24825 05

THE DEATH RATE DUE TO LUNG CANCER IN PEOPLE LIVING IN
SELECTED TOWNS IN POLAND IN THE POLLUTION OF THE ATMOSPHERE.
APTIC-24935 07

RESPIRATORY DAMAGE DUE TO ATMOSPHERIC POLLUTANTS IN THE
ENGLISH SPARROW, PASSER DOMESTICUS.
APTIC-25577 08

LICHENS AS AN INDICATOR OF AIR POLLUTION.
APTIC-25655 08

POLYNUCLEAR AROMATIC HYDROCARBON COMPOSITION OF THE
ATMOSPHERE IN SOME LARGE AMERICAN CITIES.
APTIC-25693 04

AN ANALYSIS OF THE DRIVING PATTERN IN THE METROPOLITAN AREA.
PART II.
APTIC-25725 01

AN ANALYSIS OF THE DRIVING PATTERN IN METROPOLITAN AREA.
PART I.
APTIC-25726 01

URBAN-RURAL DIFFERENCES IN LUNG CANCER MORTALITY RATES IN
THE STATE.
APTIC-25849 07

ON RELATIONSHIP OF CHRONIC RESPIRATORY DISEASES TO AIR
POLLUTION.
APTIC-26032 07

THE INFLUENCE OF AIR POLLUTION. 3.1. THE INFLUENCE OF AIR
POLLUTION ON TREES. 2. THE CHARACTERISTICS OF INSOLUBLE
SUBSTANCES ADHERED TO THE LEAVES OF ROADSIDE TREES.
APTIC-26035 08

DEGREE OF AIR POLLUTION IN KANAGAWA PREFECTURE.
APTIC-26052 04

SURVEY OF ACTUAL CONDITICNS OF AIR POLLUTION. 1. AIR
POLLUTION IN KEIHIN INDUSTRIAL AREA (1).
APTIC-26130 04

URBAN PLANNING ASPECTS OF AIR POLLUTION ABATEMENT.
APTIC-26157 12

'THE WEEK OF DRUG AND HEALTH' IN 1969. REPORT ON THE
INVESTIGATION OF PUBLIC NUISANCE BY TRAFFIC IN BIG CITIES IN
JAPAN.
APTIC-26286 04

UREA
CHEMICAL SUPPRESSION OF NITROGEN OXIDES.
APTIC-25714 02

URINALYSIS
THE EFFECT OF FLUORINE ON DAIRY CATTLE. V. FLUORINE IN THE
URINE AS AN ESTIMATOR OF FLUORINE INTAKE.
APTIC-25735 08

THE PUBLIC HEALTH SIGNIFICANCE OF ATMOSPHERIC LEAD.
APTIC-25991 07

VAPOR RECOVERY SYSTEMS
LOADING FACILITIES.
APTIC-24601 01

VAPORIZATION
THE REVAPORIZATION OF LIQUEFIED NATURAL GAS.
APTIC-24919 02

VAPORS
DAYTIME TRACKING OF A HIGH-ALTITUDE VAPOR TRAIL.
APTIC-23591 03

TOXICITY OF NO2 VAPORS AT VERY LOW LEVELS. A PRELIMINARY
REPORT.
APTIC-24588 07

THE TOXICOLOGICAL BASIS OF THRESHOLD LIMIT VALUES 5. THE
EXPERIMENTAL INHALATION OF VAPOR MIXTURES BY RATS, WITH
NOTES UPON THE RELATIONSHIP BETWEEN SINGLE DOSE INHALATION
AND SINGLE DOSE ORAL DATA.
APTIC-26270 07

VEHICLES
THE EXCESS FUEL CONSUMED BY CARS WHEN STARTING FROM COLD.
APTIC-24605 01

VENTILATION
VENTILATION AT NON-FERROUS MELTING AND POURING OPERATIONS.
APTIC-24607 02

VENTILATION OF POLLUTED AIR IN ROOMS. VIII. STUDIES ON
THEORETICAL EQUATIONS FOR VENTILATION OF POLLUTED AIR
DIFFUSED HETEROGENEOUSLY IN ROOM.
APTIC-24647 06

PLANT SERVICES BEAT EXPLOSION HAZARDS.
APTIC-24810 02

TRIBUTARY VENTILATION WITH A FOAM FILTER.
APTIC-24887 02

EXPERIMENTAL AIR QUALITY FORECASTS IN THE SACRAMENTO VALLEY.
APTIC-26088 05

VENTILATION (PULMONARY)
TRANSFER VALUES OF CARBON MONOXIDE IN NORMAL HUMANS IN A
STABLE VENTILATION STATE AT REST.
APTIC-24931 06

SPIROGRAM AND WASH-OUT CURVE DO THESE METHODS DISCRIMINATE
BETWEEN THE EFFECTS OF DUST INHALATION AND SMOKING UPON LUNG
VENTILATION.
APTIC-25576 07

INFLUENCE OF DUST EXPOSURE UPON THE DISTRIBUTION OF ALVEOLAR
VENTILATION.
APTIC-25627 07

VENTURI SCRUBBERS
INSTALLATION FOR THE ABSORPTION OF SULFUR DIOXIDE.
APTIC-24750 02

ABSORPTION OF SULFUR DIOXIDE IN A VENTURI TUBE.
APTIC-25768 02

STUDY ON THE WET-TYPE COLLECTOR USED ON THE PROCESS FOR THE
PRODUCTION OF SLAKED LIME.
APTIC-26072 02

VISIBILITY
A STATISITICAL STUDY ON VISIBILITY FORECASTING (PART I).
APTIC-22803 05

AIR POLLUTION II. METEOROLOGICAL ASPECTS OF URBAN
POLLUTION.
APTIC-24669 05

SULFUR DIOXIDE, SULFURIC ACID AEROSOL AND VISIBILITY IN LOS
ANGELES.
APTIC-26216 04

VOLATILITY
AUTOMOTIVE STARTING AND WARM-UP RESPOND TO GASOLINE
VOLATILITY.
APTIC-25931 01

HYDROCARBON CONTROL FOR LOS ANGELES BY REDUCING GASOLINE
VOLATILITY.
APTIC-26199 02

VOLCANOES
POSSIBLE CAUSES OF REDUCTION IN DIRECT SOLAR RADIATION.
APTIC-24896 05

VOLTAGE
EXAMINATION OF THE BEHAVIOR OF HIGH VOLTAGE INSULATORS UNDER
POLLUTION CONDITIONS, USING A CONVENTIONAL TESTING METHOD,
WITH PARTICULAR REFERENCE TO THE SELF-CLEANING APTITUDE.
APTIC-25926 11

RESULTS OF FIVE YEARS EXPERIENCE WITH THE BEHAVIOR OF
INSULATORS FOR MEDIUM VOLTAGE UNDER CONDITIONS OF NATURAL
INDUSTRIAL POLLUTION.
APTIC-26241 09

WAKAYAMA
THE STATISTICAL SURVEY ON UPPER RESPIRATORY REGION OF
SCHOOLCHILDREN IN THE AIR POLLUTION AREA IN WAKAYAMA.
APTIC-26114 07

WARREN ENGINE
ANOTHER NEW ENGINE NUDGES DETROIT.
APTIC-24968 02

WASHINGTON
CONTINUOUS AIR MONITORING PROJECTS 1968 DATA TABULATIONS
AND SUMMARIES, WASHINGTON, D. C.
APTIC-25818 04

WASHOUT
SMALL-SCALE VARIATIONS OF THE CONTAMINATION OF RAIN CAUSED
BY WASHOUT FROM THE LOW LAYERS OF THE ATMOSPHERE.
APTIC-26182 05

WATER
THE ABSORPTION OF SULFUR DIOXIDE IN WATER.
APTIC-24868 02

REMOVAL OF SULFUR DIOXIDE FROM POWER-PLANT STACK GASES.
APTIC-24916 02

WATER BALANCE
SOME DATA ON THE WATER BALANCE IN PLANTS IN THE PRESENCE OF
FLUOR IN THE SUBSTRATE.
APTIC-24787 08

WATER INJECTION

TRIAL MODEL OF DUST ELIMINATION DEVICE FOR IRON FOUNDRY CUPOLA.
APTIC-26108 02

WATER INJECTORS
WATER INJECTOR FOR ENGINE EXHAUST.
APTIC-25557 02

WATER POLLUTION
THE SOLUTION OF AIR POLLUTION CAN CAUSE WATER POLLUTION.
APTIC-24842 02

INDUSTRY, ENVIRONMENT AND ENVIRONMENTAL PROTECTION.
APTIC-25541 12

WEATHER FORECASTING
A STATISITICAL STUDY ON VISIBILITY FORECASTING (PART I).
APTIC-22403 05

WEATHER MODIFICATION
THE GLOBAL CIRCULATION OF ATMOSPHERIC POLLUTANTS.
APTIC-25907 05

WEST AND GAEKE
DEPENDENCE OF SULFUR DIOXIDE ABSORPTION ON TEMPERATURE IN THE WEST-GAEKE METHOD.
APTIC-24652 03

PERFORMANCE OF A CONTINUOUS COLORIMETRIC AIR MONITOR.
APTIC-24728 03

WEST VA
NEW CUMBERLAND, WEST VIRGINIA -- KNOX TOWNSHIP, OHIO -- AIR POLLUTION ABATEMENT ACTIVITY.
APTIC-26087 04

WEST VIRGINIA
RECOMMENDATIONS AND SUMMARY OF PARKERSBURG, W. VA.-MARIETTA, OHIO, INTERSTATE AIR POLLUTION ABATEMENT CONFERENCE.
APTIC-24858 12

PARKERSBURG, WEST VIRGINIA--MARIETTA, OHIO, AIR POLLUTION ABATEMENT ACTIVITY SUPPLEMENTAL TECHNICAL REPORT.
APTIC-25780 04

WINDS
WIND DIRECTION, VELOCITY AND TURBULENCE INSTRUMENTATION FOR AIR POLLUTION DIAGNOSIS.
APTIC-24862 03

AN ANALYSIS OF TURBULENCE STATISTICS AT FORT WAYNE, INDIANA.
APTIC-25916 05

DEFLECTION OF A JET INJECTED INTO A STREAM.
APTIC-25942 05

LABORATORY SIMULATION OF THE ATMOSPHERIC BOUNDARY LAYER.
APTIC-25981 05

A METEOROLOGICALLY OPERATED STACK CONTROL SYSTEM.
APTIC-26148 02

THE ROLE OF THE WINDS WITH SOUTHERN COMPONENT IN THE AIR POLLUTION.
APTIC-26294 05

WORCESTER COUNTY
AIR POLLUTION IN WORCESTER COUNTY MARYLAND.
APTIC-12834 01

X-RAYS
IMPROVEMENT OF X-RAY SPECTROGRAPHIC ANALYSIS OF FILTRATION OF THE L LINES FROM THE PRIMARY BEAM.
APTIC-25822 03

YAMAGUCHI PREFECTURE
ENVIRONMENT IN YAMAGUCHI PREFECTURE.
APTIC-26281 04

YOKKAICHI
REPORT ON THE EPIDEMIOLOGICAL INVESTIGATION OF THE HEALTH EFFECTS OF AIR POLLUTION AND REPORT ON THE INVESTIGATION OF INFANT DEATHS IN THE YOKKAICHI DISTRICT.
APTIC-26169 07

PRESENT STATE OF AIR POLLUTION IN YOKKAICHI AND VARIOUS MEDICAL PROBLEMS ABOUT IT.
APTIC-26305 07

YOKOHAMA
HORIZONTAL AND VERTICAL DISTRIBUTION OF LEAD PARTICULATES IN AIR AROUND A BUSY ROAD IN YOKOHAMA CITY.
APTIC-25881 04

THE INVESTIGATION OF THE ACTUAL CONDITION OF AIR POLLUTION. 1.1 AIR POLLUTION IN THE KEIHIN INDUSTRIAL DISTRICTS.
APTIC-26044 04

ZINC
ATMOSPHERIC CORROSION OF ZINC- AND CADMIUM-COATED STEEL AND THE COEFFICIENTS FOR RECALCULATING THE RESULTS OF ACCELERATED CORROSION TESTS INTO DATA FOR SERVICE CONDITIONS.
APTIC-24972 09

TECHNOLOGY OF POLLUTION-CONTROL IN ZINC AND LEAD SMELTING.
APTIC-26107 01

LUCAS BACK THE ZINC-AIR BATTERY.
APTIC-26140 02

ZINC COMPOUNDS
USE OF ELECTROLYSIS TO DETERMINE TRACE AMOUNTS OF LEAD, COPPER, AND ZINC IN STUDIES OF THE ATMOSPHERE.
APTIC-25979 03

ZURICH
HYGIENIC STUDIES OF THE ATMOSPHERE IN SETTLEMENTS OF THE ZURICH REGION.
APTIC-26081 04

ZURICH (SWITZERLAND)
THE TECHNIQUES OF MEASUREMENT IN THE OIL HEATING CONTROL OF THE CITY OF ZURICH AND THE WAY OF ITS APPLICATION.
APTIC-26137 03

2-NITROPROPANE
DETERMINATION OF 2-NITROPROPANE AND OF NITRITE IN MIXTURES.
APTIC-25824 03

5'-7'-DICHLORO-6'-NITRO-1-3-3-TRIMETHYL-INDOLINO-BENZOPYRYLOSPIRAN (I)
PRIMARY PHOTOCHEMICAL PROCESSES IN THE 3660 A PHOTOLYSIS OF 5',7'-DICHLORO-6'-NITRO-1,3,3-TRIMETHYL-INDOLINO-BENZOPYRYLOSPIRAN(I) IN ACETONITRILE.
APTIC-24042 06

PERSONAL AUTHOR INDEX

A, VALORI
AUTOMOTIVE AIR POLLUTION AND PROBLEMS RELATAD TO ITS CONTROL EXPERIMENTATION WITH A HETEROGENEOUS AFTERBURNER.
APTIC-26300 01

F, V.
AUTOMOTIVE AIR POLLUTION AND PROBLEMS RELATED TO ITS CONTROL EXPERIMENTATION WITH A HETEROGENEOUS AFTERBURNER.
APTIC-26300 01

ABADIE, V. H.
THE REVAPORIZATION OF LIQUEFIED NATURAL GAS.
APTIC-24919 02

ABEL, W. T.
METER FOR DETERMINING MASS FLOW OF SOLIDS IN MULTI-PHASE FLUIDS.
APTIC-24590 06

ADACHI, TAKATOSHI
STUDY ON THE REMOVAL EFFICIENCY OF SO2 GASES BY A WET-TYPE ELECTRIC PRECIPITATOR.
APTIC-25720 02

ADAMS, CLARK E.
HYDRODESULFURIZATION OF HEAVY PETROLEUM DISTILLATES.
APTIC-25713 02

ADAMS, DONALD F.
AN AUTOMATIC HYDROGEN FLUORIDE RECORDER PROPOSED FOR INDUSTRIAL HYGIENE AND STACK MONITORING.
APTIC-25687 03

FURTHER APPLICATIONS OF THE LIMED FILTER PAPER TECHNIQUE IN FLUORINE AIR POLLUTION STUDIES.
APTIC-25816 03

ADAMS, F. W.
THE ABSORPTION OF SULFUR DIOXIDE IN WATER.
APTIC-24868 02

ADELMAN, HARVEY M.
A PRELIMINARY EXPLORATION OF THE RELATIONSHIP BETWEEN AIR POLLUTION AND CITY DATA.
APTIC-24611 12

APTIC-24611 12

ADLER, STEPHEN FRED
IMPROVED PROCEDURE FOR PURIFYING THE EXHAUST OF INTERNAL COMBUSTION MOTORS.
APTIC-26243 02

AGRANOV, KH. I.
THE USE OF SILOXENE FOR DETERMINING SMALL AMOUNTS OF NITROGEN DIOXIDE.
APTIC-24839 03

AGREN, P. H. W.
METHOD OF MANUFACTURING SULFUR BY THE REDUCTION OF SULFUR DIOXIDE.
APTIC-25974 02

METHOD FOR MANUFACTURING SULFUR FROM ROASTING GASES CONTAINING SULFUR DIOXIDE.
APTIC-26180 02

AIZENBERG, V. SH.
FINE FILTRATION OF PROCESS AND WASTE GASES FROM LEAD PRODUCTION WITH THE AID OF JET BLAST BAG FILTERS.
APTIC-24771 02

AKAZAKI, T.
METHOD OF ELIMINATING SULFUR COMPOUNDS FROM OIL WITH THE USE OF MICROBES.
APTIC-24641 02

APTIC-24641 02

MICROBIAL REMOVAL OF SULFIDE CONTAINED IN PETROLEUM.
APTIC-25101 02

ALBERT, ROY E.
REVIEW OF TENTATIVE ABORT, ALERT, 100 AND 1000-DAY LIMITS FOR SPACE CABIN CONTAMINANTS.
APTIC-24957 11

FABRICATION OF MONODISPERSE LUCITE AND IRON OXIDE PARTICLES WITH A SPINNING DISK GENERATOR.
APTIC-26251 07

ALGREN, A. B.
CENTRIFUGE SEDIMENTATION SIZE ANALYSIS OF SAMPLES OF AIRBORNE DUSTS COLLECTED IN MEMBRANE FILTERS.
APTIC-25043 03

ALKEZWEENY, A. J.
THE MILLIPORE FILTER TECHNIQUE FOR ICE NUCLEI MEASUREMENT.
APTIC-24626 03

ALKIRE, H. L.
AIR POLLUTION IN CALVERT COUNTY, MARYLAND.
APTIC-12832 01

AIR POLLUTION IN ST. MARY'S COUNTY, MARYLAND.
APTIC-12833 01

AIR POLLUTION IN WORCESTER COUNTY MARYLAND.
APTIC-12834 01

ALLAN JR, ADRIAN D.
FILTER FRAME SEAL.
APTIC-25571 02

ALONSO, PATRICIA
AIR POLLUTION VI. BRONCHIAL-PULMONARY ALTERATIONS CAUSED BY AIR POLLUTION.
APTIC-24668 07

ALTSHULLER, AUBREY P.
THERMODYNAMIC CONSIDERATIONS IN THE INTERACTIONS OF NITROGEN OXIDES AND OXY-ACIDS IN THE ATMOSPHERE.
APTIC-24015 05

NATURAL SOURCES OF GASEOUS POLLUTANTS IN THE ATMOSPHERE.
APTIC-24615 05

ELECTRONIC ABSORPTION SPECTRA OF INORGANIC AND ORGANIC COMPOUNDS OF NITROGEN. I. NITROGEN DIOXIDE-DINITROGEN TETROXIDE IN SOLUTION.
APTIC-26253 06

ALTSHULLER, A. P.
THERMODYNAMIC FUNCTIONS FOR NITROGEN DIOXIDE AND NITROUS ACID.
APTIC-25958 06

ANTONER, R. E.
THE MICRODETERMINATION OF FLUORIDE IN VEGETATION.
APTIC-24966 03

ANDERSON, A.
POSSIBLE LONG TERM EFFECTS OF EXPOSURE TO SULPHUR DIOXIDE.
APTIC-25046 07

ANDERSON, A. E.
A COOPERATIVE STUDY OF CERTAIN MEASUREMENTS OF EMPHYSEMA.
APTIC-24804 07

ANDERSON, DAVID M.
URBAN-RURAL DIFFERENCES IN LUNG CANCER MORTALITY RATES IN THE STATE.
APTIC-25049 07

ANDERSSON, A. G.
METHOD FOR OBTAINING SULFUR FROM THE GASEOUS PRODUCTS GIVEN OFF BY THE ROASTING AND SMELTING OF SULFIDE ORES.
APTIC-26179 02

ANDERSSON, TAGE
SMALL-SCALE VARIATIONS OF THE CONTAMINATION OF RAIN CAUSED BY WASHOUT FROM THE LOW LAYERS OF THE ATMOSPHERE.
APTIC-26182 05

ANDO, NUNIO
ELECTROSTATIC PRECIPITATOR.
APTIC-26265 02

ANGSTROM, ANDERS
TECHNIQUES FOR DETERMINING THE TURBIDITY OF THE ATMOSPHERE.
APTIC-25959 03

ANNENKOV, V. A.
INVESTIGATION OF MASS TRANSFER IN A SCRUBBER WITH TAPERED-SLOT TRAYS.
APTIC-24885 02

ANNIS, J. C.
CENTRIFUGE SEDIMENTATION SIZE ANALYSIS OF SAMPLES OF AIRBORNE DUSTS COLLECTED IN MEMBRANE FILTERS.
APTIC-25043 03

ANTIPOV, V. G.
THE EFFECT OF SPECIFIC INDUSTRIAL GASES ON THE GROWTH OF SOME TREE SPECIES.
APTIC-24864 08

THE INFLUENCE OF SMOKE AND GAS ON THE FLOWERING AND FRUITING OF SOME TREES AND SHRUBS.
APTIC-24865 08

AOKI, KIMIKO
ON THE INVESTIGATION OF PUBLIC NUISANCE IN AJIMANO AREA, TAKEFU CITY.
APTIC-26028 08

APPELL, HERBERT R.
CONVERSION OF URBAN REFUSE TO OIL.
APTIC-25753 02

APPELL, LOUIS
ODOR INTENSITY.
APTIC-26096 03

ARAKI, H.
AUTOMATED DESIGN OF STEEL-FRAME SUPPORTED CHIMNEYS.
APTIC-26015 14

ARDOINO, V.
STUDIES ON HUMAN AND EXPERIMENTAL LEAD POISONING. THE INHIBITORY MECHANISM OF RED BLOOD CELL ALA-DEHYDRATASE.
APTIC-24784 07

ARROYO-GARCIA, JOSE

AIR POLLUTION II. METEOROLOGICAL ASPECTS OF URBAN POLLUTION.
APTIC-24669 05

ASAI, OSAMU
CORROSION PRODUCTS IN VARIOUS ENVIRONMENTS.
APTIC-25727 09

ASANO, KAZUTOSHI
CONDUCTION AND PUMPING IN DIELECTRIC LIQUIDS UNDER THE INFLUENCE OF AN APPLIED ELECTRIC FIELD.
APTIC-25684 06

ASANO, TOYOSHI
DISPOSAL OF WASTE GAS CONTAINING DELUTE SULFUR OXIDE.
APTIC-24673 02

ASBRINK, L.
THE PHOTOELECTRON SPECTRA OF O2, N2 AND CO.
APTIC-24889 06

ASHBY, H. ANTHONY
EXHAUST EMISSIONS FROM SEVEN LP GAS POWERED VEHICLES.
APTIC-25678 02

ASTRUP, POUL
THRESHOLD LIMIT VALUES FOR CARBON MONOXIDE.
APTIC-26103 11

ATKINS, P. R.
LEAD IN A SUBURBAN ENVIRONMENT.
APTIC-24952 04

ATSUKAWA, MASUMI
A NEW DRY PROCESS OF SO2 REMOVAL FROM FLUE GAS.
APTIC-24589 02

ATSUKAWA, M.
DISPOSAL METHOD OF SULFUR OXIDE (SO2, SO3)-CONTAINING GAS.
APTIC-26105 02

AUERMANN, E.
DETERMINATION OF ARSENIC IN THE ATMOSPHERE.
APTIC-25861 03

AUJESZKY, LASZLO
THE ROLE OF THE WINDS WITH SOUTHERN COMPONENT IN THE AIR POLLUTION.
APTIC-26294 05

AUTIAN, JOHN
TOXICOLOGIC ASPECTS OF FLAMMABILITY AND COMBUSTION OF POLYMERIC MATERIALS.
APTIC-24153 07

AWA, A.
EFFECT OF AUTOMOBILE EXHAUST ON CELL GROWTH IN VITRO.
APTIC-25604 03

BABA, Y.
DEODORIZING EQUIPMENT AND DEODORANTS.
APTIC-26128 02

BACANER, MARVIN
PHYSIOLOGIC PROCESSES IN ABSORPTION OF POLLUTANTS.
APTIC-25988 07

BACCAREDDA, M.
PRODUCTION OF CARBON DISULFIDE FROM METHANE AND SULFUR DIOXIDE.
APTIC-24596 06

BACH, HELMUT
PRIMARY PHOTOCHEMICAL PROCESSES IN THE 3660 A PHOTOLYSIS OF 5',7'-DICHLORO-6'-NITRO-1,3,3-TRIMETHYL-INDOLINO-BENZOPYRYLOSPIRAN(I) IN ACETONITRILE.
APTIC-24042 06

BACK, KENNETH C.
PSYCHOPHARMACOLOGY OF CARBON MONOXIDE UNDER AMBIENT AND ALTITUDE CONDITIONS.
APTIC-24958 07

BACON, RAYMOND FOSS
IMPROVEMENTS IN RECOVERY OF SULPHUR DIOXIDE FROM GASES.
APTIC-24591 02

BACON, RAYMOND F.
RECOVERY OF SULPHUR.
APTIC-24576 02

BADCOCK, CHARLES
A STUDY OF THE DECAY PROCESSES IN THE TRIPLET SULFUR DIOXIDE MOLECULE EXCITED AT 3828.8 A.
APTIC-26152 06

BADZIOCH, S.
COLLECTION OF GAS-BORNE DUST PARTICLES BY MEANS OF AN ASPIRATED SAMPLING NOZZLE.
APTIC-25957 03

BANNO, GOSTA
DESULFURIZATION OF FLUE GASES- THE PRESENT SITUATION. PART I.
APTIC-24707 02

AN ABSORPTION SCRUBBER FOR DESULFURIZATION.
APTIC-26159 02

BALAREV, KHR.
EFFECT OF SURFACE-ACTIVE AGENTS ON THE RATE OF ABSORPTION.
APTIC-24790 06

BALAZOVA, G.
THE EFFECT OF FLUORINE INHALATION ON ANIMALS IN THE SURROUNDINGS OF AN ALUMINUM PLANT.
APTIC-25665 08

BALCEROWSKA, IRENA
EXTENSIVE PULMONARY CHANGES IN AN APPARENTLY LIGHT NITROGEN OXIDES POISONING.
APTIC-25747 07

BALCHUM, OSCAR J.
OZONE AND LIPID PEROXIDATION.
APTIC-24953 07

BALUSTEIN, BERNARD
TEMPERATURE AS A FACTOR IN DETERMINING ORDER OF ELUTION IN GAS-LIQUID CHROMATOGRAPHY OF SOME C5-C8 HYDROCARBONS.
APTIC-24587 03

BALZER, J. LEROY
HEALTH EFFECTS OF PARTICULATE AIR POLLUTION CHARACTERIZATION OF COMPACT AND FIBROUS COMPONENTS.
APTIC-25582 03

BANDO, SHIGEYUKI
RESEARCHES ON AUTO EXHAUST GAS POLLUTION AND TRAFFIC NOISES IN TOKUSHIMA CITY. PART I.
APTIC-26284 04

BAPSERES, P.
PURIFICATION OF FUMES IN THE LACQ COMPLEX.
APTIC-24706 02

BARBER, J. C.
FLUORIDE RECOVERY FROM PHOSPHORUS PRODUCTION.
APTIC-24834 02

BARNARD, ROBERT D.
THE PATHODYNAMICS OF HEMOPOIESIS SUPPRESSION BY NITROUS OXIDE.
APTIC-25667 08

BAPR, HARRY F.
AUTOMOTIVE AIR POLLUTION CONTROL.
APTIC-23369 02

BARTAKOVA, BERNARDA
ROTARY MACHINES FOR EXTREME CLIMATIC CONDITIONS.
APTIC-25741 09

BARTH, D. S.
CONSIDERATIONS IN DEVELOPING AIR QUALITY CRITERIA.
APTIC-25575 11

THE AIR POLLUTION RESEARCH PROGRAM OF THE COORDINATING RESEARCH COUNCIL.
APTIC-25965 12

BARTH, H.
NEW DUST REMOVAL METHODS IN THE TOBACCO INDUSTRY.
APTIC-25588 02

BARTMAN, FRED L.
HIGH ALTITUDE RADIATION MEASUREMENTS. (QUARTERLY REPORT).
APTIC-24753 03

BARTOK, W.
SYSTEMS STUDY OF NITROGEN OXIDE CONTROL METHODS FOR STATIONARY SOURCES.
APTIC-12619 02

CONTROL OF NITROGEN OXIDE EMISSIONS FROM STATIONARY COMBUSTION SOURCES.
APTIC-24678 02

BARTON, K.
CURRENT PROBLEMS OF THE THEORY OF ATMOSPHERIC CORROSION.
APTIC-25937 09

BARTOVSKY, T.
AUTOMATIC ANALYSIS OF GASEOUS IMPURITIES IN THE ATMOSPHERE.
APTIC-22220 03

BASMADZHIEVA, K.
FEATURES OF A COMBINED ACTION OF SULFUROUS GAS AND CARBON MONOXIDE IN THEIR JOINT PRESENCE IN THE ATMOSPHERE.
APTIC-25790 07

BASU, P. K.
THE EFFECT OF AIR POLLUTANTS ON THE EYE. I. THE EFFECT OF AN ORGANIC EXTRACT ON THE CONJUNCTIVAL GOBLET CELLS.
APTIC-25703 07

BATHKE, W. L.
A REVIEW AND COMPARISON OF SELECTED UNITED STATES ENERGY FORECASTS.
APTIC-26085 01

BAUDER, C. J.
CHARACTERISTICS AND APPLICATION OF HIGH PERFORMANCE DRY FILTERS.
APTIC-25766 02

BAUGHMAN, PAULINE K.
DETERMINATION OF 2-NITROPROPANE AND OF NITRITE IN MIXTURES.
APTIC-25824 03

BAUM, FRITZ
THE AMOUNT OF SULPHUR TRIOXIDE ACCUMULATED ON FIBRE-GLASS

FILTERS USED FOR DETERMINING DUST CONTENT IN FLUE GASES.
APTIC-24584 03

THE MEASUREMENT OF EMISSIONS FROM SOLID FUEL HEATING UNIT.
APTIC-25921 03

BEAVER, HUGH E. C.
THE GROWTH OF PUBLIC OPINION.
APTIC-25776 13

BECK, H.
CUPOLA DUST REMOVAL WITH REGARD TO THE PROJECTED STANDARD VDI 2288 ON 'LIMITATION OF DUST EMISSION FROM CUPOLAS'.
APTIC-25540 02

BEECHING, W. E. J.
FLUE-GAS WASHING TRIALS AND CONCLUSIONS.
APTIC-25663 02

BEGEMANN, F.
OXYGEN-18 VARIATIONS IN ATMOSPHERIC CARBON DIOXIDE THE NASL DATA.
APTIC-26077 05

BEHLE, CALVIN A.
INDUSTRY-THE VIEWS OF THE REGULATED.
APTIC-24949 12

BEINE, HELMUT
THE AMOUNT OF SULPHUR TRIOXIDE ACCUMULATED ON FIBRE-GLASS FILTERS USED FOR DETERMINING DUST CONTENT IN FLUE GASES.
APTIC-24584 03

BELLER, MORRIS
OZONE SYNTHESIS FOR WATER TREATMENT BY HIGH ENERGY RADIATION.
APTIC-24041 06

BELLIN, ANTHONY
DETERMINATION OF SMALL AMOUNTS OF SULFURIC ACID IN THE ATMOSPHERE.
APTIC-24874 04

BELL, G. B.
LITERATURE REVIEW OF METROPOLITAN AIR POLLUTANT CONCENTRATIONS--PREPARATION, SAMPLING AND ASSAY OF SYNTHETIC ATMOSPHERES. (FINAL REPORT).
APTIC-22812 03

BELYAYEV, I. I.
A SCIENTIFIC-TECHNICAL CONFERENCE ON DECONTAMINATION OF INDUSTRIAL EFFLUENTS AND ATMOSPHERIC DISCHARGES.
APTIC-24627 14

APTIC-24627 14

BENARIE, M.
ATTEMPT TO DEFINE THE EXPOSURE LIMITS OF CONCENTRATION FOR SO2, CL2, H2S, AND THE NITROGEN OXIDES IN AN URBAN ATMOSPHERE.
APTIC-24941 11

BENES, NORMAN S.
EXPERIMENTAL AIR QUALITY FORECASTS IN THE SACRAMENTO VALLEY.
APTIC-26088 05

BENGEANU, L.
SPECTROCOLORIMETRIC DETERMINATION OF HEXACHLOROCYCLOHEXANE IN THE ATMOSPHERE.
APTIC-24975 03

BENSON, S. W.
KINETIC EVIDENCE CONCERNING THE GEOMETRY OF SUBSTITUTED METHYL RADICALS.
APTIC-25905 06

BENT, R.
A METHOD FOR THE ESTIMATION OF SULPHUR TRIOXIDE.
APTIC-25940 03

BERENYI, M.
THE ROLE OF THE SAMPLE HOLDER IN THE THERMAL INVESTIGATION OF PROCESSES ACCOMPANIED BY THE SPLITTING OFF OF CO.
APTIC-24653 06

BERGER, HEINZ
CATALYST FOR ENGINE EXHAUST-GAS REFORMATION.
APTIC-25553 02

BERG, M.
HYDROCHLORIC ACID. BROMINE. IODINE. HYDROGENCYANIDE. ETHYLENE. CARBONMONOXIDE. MERCAPTANS. COAL GAS. ASPHALT-AND TAR-VAPORS. SATURATED HYDROCARBONS. ACETIC ACID. 2,4-DICHLORO-PHENOXY-ACETIC ACID. MERCURY. SELENIUM. SMOKE AND FOG.
APTIC-25826 08

BERNATSKY, A.
THE IMPORTANCE OF PROTECTIVE PLANTINGS AGAINST AIR POLLUTANTS.
APTIC-24730 02

BERNERT, JUERGEN
DETAILED DETERMINATION OF NITROGEN COMPOUNDS CONTAINED IN WASTE GASES.
APTIC-24682 03

BERNHOFF, D.
EXPERIENCES WITH THE USE OF LIME IN FLUE GAS DESULPHURIZATION.
APTIC-24613 02

BERRUYER-DESIROTTE, NICOLE
BIBLIOGRAPHICAL STUDY OF THE ABSORBENT PROPERTIES OF OZONE IN THE ULTRAVIOLET RANGE.
APTIC-25788 05

BERRY, J.-P.
STUDY OF PULMONARY DUST DEPOSITS WITH ELECTRON MICROSCOPE AND MICROANALYSIS WITH AN ELECTRONIC PROBE.
APTIC-26110 07

BERUKSHTIS, G. K.
ATMOSPHERIC CORROSION OF ZINC- AND CADMIUM-COATED STEEL AND THE COEFFICIENTS FOR RECALCULATING THE RESULTS OF ACCELERATED CORROSION TESTS INTO DATA FOR SERVICE CONDITIONS.
APTIC-24972 09

BEST, GORDON T.
DAYTIME TRACKING OF A HIGH-ALTITUDE VAPOR TRAIL.
APTIC-23591 03

BETHEA, R. M.
SINGLE DETECTOR AND FORECOLUMN TRAP FOR SERIES GAS-CHROMATOGRAPHY ANALYSIS.
APTIC-24699 03

BEUERMAN, DONALD R.
SIMULTANEOUS DETERMINATION OF CARBON AND SULFUR IN ORGANIC COMPOUNDS BY GAS CHROMATOGRAPHY.
APTIC-24901 03

BEWILOGUA, L.
CONTINUOUSLY WORKING PLANT FOR THE SEPARATION OF NEON-HELIUM MIXTURES.
APTIC-25809 02

BIAVA, FRANK P.
MICRO-PARR ASSEMBLY SUITABLE FOR MICRODETERMINATION OF FLUORINE IN ORGANIC COMPOUNDS.
APTIC-25752 03

BIERLY, EUGENE W.
A METEOROLOGICALLY OPERATED STACK CONTROL SYSTEM.
APTIC-26148 02

BIERMAN, GEORGE F.
PLUME EFFECTS OF NATURAL DRAFT HYPERBOLIC COOLING TOWERS.
APTIC-24835 05

BINEK, B.
TEMPERATURE CHARACTERISTICS OF FIBRE FILTERS.
APTIC-25798 02

BITTING, CARROLL H.
PLUME EFFECTS OF NATURAL DRAFT HYPERBOLIC COOLING TOWERS.
APTIC-24835 05

BIZZELL, GARY DON
THE ROLE OF DIFFUSIVITY IN TURBULENT DISPERSION.
APTIC-24909 06

BLACKETT, J. H.
THE DESIGN ANL CONSTRUCTION OF A PHOTOELECTRONIC SCANNING MACHINE FOR S. ING MICROSCOPIC PARTICLES.
APTIC-25943 03

BLAZEK, J.
METHOD AND EQUIPMENT FOR MAKING PREPARATIONS OF MICROSCOPIC PARTICLES OF SOLID SUBSTANCES.
APTIC-24598 03

BLITZSTEIN, W.
THE WAVELENGTH DEPENDENCE OF ATMOSPHERIC EXTINCTION.
APTIC-24658 05

BLOCH JR, WINSTON W.
A NEW GLUE HOLDS RIGID CUP ECG SKIN ELECTRODES FOR 24 HOURS AND LONGER.
APTIC-25626 07

BNUKOV, A. K.
DEVELOPMENT AND TESTING, WITH STANDARDIZED MIXTURES AND ON A VAPOR GENERATOR, OF AN INSTRUMENT FOR MEASURING SO3 IN COMBUSTION PRODUCTS.
APTIC-24879 03

BOCEK, KAREL
MECHANISM OF TOXIC VAPOUR UPTAKE BY LUNG. I. EXPERIMENTAL APPARATURE RECORDING ORGANIC VAPOUR CONCENTRATIONS IN EXPIRED AIR.
APTIC-24648 07

BODEN, AXEL
REPRESENTATION OF PARTICLE-SIZE DISTRIBUTIONS BY MEANS OF A SIMPLE SPECTROMETER AS AN ACCESSORY TO SCATTERED LIGHT MEASURING DEVICES.
APTIC-26062 03

BOEWING, HANS-ACHIM
A NEW ROAD TO ACCELERATED GRAIN-SIZE ANALYSIS IN THE RANGE FROM 10 MICRON TO 0.1 MICRON IN DIAMETER.
APTIC-26060 03

BOISSERRE, KLAUS
STRUCTURE AND WORK OF THE AIR POLLUTION CONTROL ADMINISTRATION IN THE FEDERAL REPUBLIC OF GERMANY-EXPERIENCES, PROBLEMS, INTERNATIONAL COMPARISONS.
APTIC-25551 12

BOL, JAN

A SCATTERED LIGHT PARTICLE-SIZE SPECTROMETER FOR SUBMICROSCOPIC AEROSOLS OF HIGH CONCENTRATION.
APTIC-25871 03

BONAMASSA, F.
LOADING FACILITIES.
APTIC-24601 01

BONATTI, ENRICO
DUST IN THE CARIBBEAN ATMOSPHERE TRACED TO AN AFRICAN DUST STORM.
APTIC-24632 05

BONNET, FREDERIC
A COMPARISON OF THE EFFECT ON RAYON FABRICS OF VARIOUS GASES UNDER CONTROLLED CONDITIONS.
APTIC-25772 09

BONSIGNORE, D.
STUDIES ON HUMAN AND EXPERIMENTAL LEAD POISONING. THE INHIBITORY MECHANISM OF RED BLOOD CELL ALA-DEHYDRATASE.
APTIC-24784 07

BOOGAERDT, C. A.
AIR POLLUTION FROM SOLDERING FUMES.
APTIC-25624 07

BOREN, HOLLIS G.
PATHOBIOLOGY OF AIR POLLUTANTS.
APTIC-25971 07

BORHO, KLAUS
A SCATTERED LIGHT MEASURING DEVICE FOR HIGH CONCENTRATIONS OF DUST.
APTIC-25870 03

BORTNER, M. H.
PRODUCTION AND DESTRUCTION MECHANISMS FOR O2 (1 DELTA G) IN THE LOWER ATMOSPHERE.
APTIC-24836 05

BORZENKOVA, I. I.
POSSIBLE CAUSES OF REDUCTION IN DIRECT SOLAR RADIATION.
APTIC-24896 05

BOSSAVY, J.
INFORMATION ON DAMAGE CAUSED BY AIR POLLUTION TO THE PLANTS AND ANIMALS IN EUROPEAN COUNTRIES.
APTIC-24933 08

BOYCE, DAVID E.
ECOLOGICAL STATISTICAL STUDIES CONCERNING ENVIRONMENTAL POLLUTION AND CHRONIC DISEASE.
APTIC-25873 07

BOYER, H. KARL
A STUDY OF THE EFFECTS OF AIR POLLUTANTS ON THE EYE.
APTIC-25756 07

BRADFORD, WENDELL C.
SOLUBILITY OF O2 AND CO IN BLOOD AND PULMONARY AND PLACENTAL TISSUE.
APTIC-24892 07

BRAGINETS, N. G.
IMPROVING THE GAS CLEANING ON 100 T OXYGEN CONVERTERS.
APTIC-24809 02

BRASSER, L. J.
ATMOSPHERIC POLLUTION IN THE USA EXPERIENCES GAINED DURING A STUDY TOUR. TECHNICAL ASPECTS.
APTIC-24639 03

BRATCHIKOV, G. G.
TESTING OF AN EXPERIMENTAL INDUSTRIAL ABSORBER WITH MOBILE PACKING.
APTIC-26019 02

BRENNER, T.
ABOUT SULFUR DIOXIDE AND DIMETHYLANILINE.
APTIC-26091 06

BRELL, HARTMUT
THE MEASUREMENT OF EMISSIONS FROM SOLID FUEL HEATING UNIT.
APTIC-25921 03

BREMEN, JACK
EXHAUST GAS WASHING APPARATUS.
APTIC-25715 02

BRENENBORG, F. J.
RESPIRATOR FILTER PENETRATION USING SODIUM CHLORIDE AEROSOL.
APTIC-25611 03

BRESLIN, J.
THE APPLICATION OF AIR SAMPLING IN THE EVALUATION AND CONTROL OF THE OCCUPATIONAL ENVIRONMENT.
APTIC-25608 03

BRESLOW, ALEXANDER
CARCINOGENIC HYDROCARBONS AND RELATED COMPOUNDS IN PROCESSED RUBBER.
APTIC-24629 01

APTIC-24629 01

BRICARD, JEAN
FORMATION OF PARTICLES OF PHOTOLYTIC ORIGIN IN AIR.
APTIC-25564 05

BRIER, G. W.
SOME STATISTICAL ASPECTS OF LONG-TERM FLUCTUATIONS IN SOLAR AND ATMOSPHERIC PHENOMENA.
APTIC-24758 05

BRINK JR, JOSEPH A.
LIQUID MIST COLLECTION.
APTIC-25717 02

BRINK JR, J. A.
FIBER MIST ELIMINATORS FOR HIGHER VELOCITIES.
APTIC-26095 02

BROCK, J. R.
THE THERMAL FORCE IN THE TRANSITION REGION.
APTIC-25832 06

COLLISION-RATE THEORY AND THE COAGULATION OF FREE-MOLECULE AEROSOLS.
APTIC-25984 05

BROCK, WERNER
THE MEASUREMENT OF EMISSIONS FROM SOLID FUEL HEATING UNIT.
APTIC-25921 03

BROGDON, VAS HUBERT
RECOVERING ELEMENTAL SULFUR FROM WATERS CONTAINING HYDROGEN SULFIDE.
APTIC-25884 02

BROMLEY, L. A.
REMOVAL OF SULFUR DIOXIDE FROM STACK GASES BY SEA WATER.
APTIC-26248 02

BROOKS, PAUL L.
GAS FILTER BAG STRUCTURE.
APTIC-25909 02

BROOMHEAD, F.
PROBLEMS OF ELECTRICAL PRECIPITATION REVIEWED.
APTIC-25643 02

BROUET, G.
STUDY OF PULMONARY DUST DEPOSITS WITH ELECTRON MICROSCOPE AND MICROANALYSIS WITH AN ELECTRONIC PROBE.
APTIC-26110 07

BROWER, M. A.
AIR POLLUTION FURNACE TYPES AND SIZES DICTATE MOST EFFECTIVE CONTROLS. PART I.
APTIC-26166 02

BROWNLIE, DAVID
SULPHUR REMOVAL FROM GASES.
APTIC-25814 02

BROWN, E. M.
ACID SMUT EMISSION PROBLEMS STUDIED.
APTIC-26118 02

BROWN, JAMES H.
PROBING THE LAW AND BEYOND A QUEST FOR PUBLIC PROTECTION FROM HAZARDOUS PRODUCT CATASTROPHES.
APTIC-24760 12

BRUECKNER, HORST
THE TECHNICAL PROCESSES FOR THE DESULFURIZATION OF GASES.
APTIC-26202 02

BRUNDAGE, NORMAN C.
SMOG CONTROL HELPS BAG MORE PROFITS.
APTIC-24782 02

APTIC-24782 02

BRYANT, PAMELA M.
EFFECT OF DILUTING STACK GASES ON DOWNWIND CONCENTRATION.
APTIC-26261 05

BUCHHOLZ, HEINZ
ON THE SEPARATION OF AIRBORNE MATTER BY INERTIA EFFECT IN THE SUBMICRONIC RANGE.
APTIC-25771 03

BUCHTA, EMIL
BENZO(A)PYRENE AND BENZ(A)ANTHRACENE.
APTIC-24905 06

BUDINSKY, KAREL
ROTATING CENTRIFUGAL SEPARATOR WITH CONTINUOUS DUST DISCHARGE.
APTIC-24831 02

BUETTNER, K.
DISCUSSION OF PAPER BY J. KROENING AND E. P. NEY, 'ATMOSPHERIC OZONE.'
APTIC-24775 05

BUNTON, C. A.
REACTION OF NITROGEN OXIDES WITH BIOLOGICALLY IMPORTANT AMINES.
APTIC-25580 06

BURCH, DARRELL E.
INVESTIGATION OF THE ABSORPTION OF INFRARED RADIATION BY ATMOSPHERIC GASES.
APTIC-25853 06

BURGGRABE, W. F.
FIBER MIST ELIMINATORS FOR HIGHER VELOCITIES.
APTIC-26095 02

BURKHEISER, W.
THE BURKHEISER GAS PURIFICATION PROCESS FOR THE RECOVERY OF AMMONIA, CYANOGEN AND HYDROGEN SULFIDE.
APTIC-26201 02

BURNS, LELAND S.
URBAN PLANNING ASPECTS OF AIR POLLUTION ABATEMENT.
APTIC-26157 12

BURNS, MICHAEL D.
LEASE-GAS SWEETENING. PART 6. HOT CARBONATE--ANOTHER POSSIBILITY.
APTIC-24871 02

BURRIDGE, I.
DISPOSAL OF FUMES FROM PVC DURING COPPER RECOVERY.
APTIC-24819 02

BURTNER, R. R.
AUTOMOTIVE STARTING AND WARM-UP RESPOND TO GASOLINE VOLATILITY.
APTIC-25931 01

BUSBY, H. G. TREVOR
CHARACTERISTICS OF ELECTROSTATIC PRECIPITATORS.
APTIC-25641 02

EFFICIENCY OF ELECTROSTATIC PRECIPITATORS AS AFFECTED BY THE PROPERTIES AND COMBUSTION OF COAL.
APTIC-25786 02

BUSINGER, J.
DISCUSSION OF PAPER BY J. KROENING AND E. P. NEY, 'ATMOSPHERIC OZONE.'
APTIC-24775 05

BUTCHER, JOHN E.
THE EFFECT OF FLUORINE ON DAIRY CATTLE. V. FLUORINE IN THE URINE AS AN ESTIMATOR OF FLUORINE INTAKE.
APTIC-25735 08

BUTTGEREIT, WERNER
EXHAUST EMISSION CONTROL BY FUEL INJECTION THE VW 1600 WITH ELECTRONICALLY CONTROLLED FUEL INJECTION SYSTEM.
APTIC-26147 02

BYKHOVER, L. N.
THERMOCHEMICAL STRENGTH OF GLASS FIBER USED IN BAG FILTERS.
APTIC-24878 02

BYLINSKY, GENE
METALLIC MENACE IN THE ENVIRONMENT.
APTIC-25705 07

CABANE, MICHAEL
FORMATION OF PARTICLES OF PHOTOLYTIC ORIGIN IN AIR.
APTIC-25564 05

CADA, VLADIMIR
ABSORPTION OF SULFUR DIOXIDE IN A VENTURI TUBE.
APTIC-25768 02

CALVERT, JACK G.
PRIMARY PHOTOCHEMICAL PROCESSES IN THE 3660 A PHOTOLYSIS OF 5',7'-DICHLORO-6'-NITRO-1,3,3-TRIMETHYL-INDOLINO-BENZOPYRYLOSPIRAN(I) IN ACETONITRILE.
APTIC-24842 06

THE FORMATION AND DECOMPOSITION REACTIONS OF THE ACETYL RADICAL AND THE HEAT OF FORMATION OF THE ACETYL RADICAL.
APTIC-25828 06

A STUDY OF THE DECAY PROCESSES IN THE TRIPLET SULFUR DIOXIDE MOLECULE EXCITED AT 3828.8 A.
APTIC-26152 06

THE DECAY MECHANISM OF TRIPLET SULFUR DIOXIDE MOLECULES FORMED BY INTERSYSTEM CROSSING IN THE FLASH PHOTOLYSIS OF SO2 (2400-3200 A).
APTIC-26154 06

CAMPBELL, E. E.
EVALUATION OF METHODS FOR THE DETERMINATION OF HALOGENATED HYDROCARBONS IN AIR.
APTIC-25692 03

CAMPBELL, KIRBY I.
EFFECTS ON CANINE PULMONARY FUNCTION VIA INDUCED NO2 IMPAIRMENT, PARTICULATE INTERACTION, AND SUBSEQUENT SOX.
APTIC-24940 07

CANTRELL, ROBERT R.
RECOVERY OF SO2.
APTIC-25560 02

CANTWELL, E. N.
EXHAUST MANIFOLD THERMAL REACTORS - A SOLUTION TO THE AUTOMOTIVE EMISSIONS PROBLEM.
APTIC-24722 02

CAREY JR, A. W.
EXHAUST EMISSION CHARACTERISTICS OF FOUR-STROKE, DIRECT INJECTION, COMPRESSION IGNITION ENGINES.
APTIC-25922 01

CARLSON, TOBY N.
DUST IN THE CARIBBEAN ATMOSPHERE TRACED TO AN AFRICAN DUST STORM.
APTIC-24632 05

CARPENTER, C. P.
THE TOXICOLOGICAL BASIS OF THRESHOLD LIMIT VALUES 5. THE EXPERIMENTAL INHALATION OF VAPOR MIXTURES BY RATS, WITH NOTES UPON THE RELATIONSHIP BETWEEN SINGLE DOSE INHALATION AND SINGLE DOSE ORAL DATA.
APTIC-26270 07

CARPENTER, FRANKLIN R.
SMELTERY FUMES--THEIR CONDENSATION AND UTILIZATION.
APTIC-25969 02

CARRE, R.
TRANSFER VALUES OF CARBON MONOXIDE IN NORMAL HUMANS IN A STABLE VENTILATION STATE AT REST.
APTIC-24931 06

CARRINGTON, J. C.
THE WORLD SUPPLY OF SULFUR.
APTIC-24917 10

CARR-BRION, K. G.
APPLICATION OF HETEROGENEITY EFFECTS ENCOUNTERED IN THE ABSORPTION AND EMISSION OF X-RAYS TO ON-STREAM SENSING OF VARIABLES SUCH AS PARTICLE SIZE.
APTIC-24600 03

CARR, R. C.
THE EFFECTS OF LEAD ADDITIVES ON REACTIONS IN EXHAUST SYSTEMS.
APTIC-25581 01

CARSTENS, J. C.
STEADY STATE AND NON-STEADY STATE DIFFUSION THEORY OF DROPLET GROWTH.
APTIC-25634 05

CARTASEGNA, C.
STUDIES ON HUMAN AND EXPERIMENTAL LEAD POISONING. THE INHIBITORY MECHANISM OF RED BLOOD CELL ALA-DEHYDRATASE.
APTIC-24784 07

CATAGNOLI, NEAL
IDENTIFICATION OF METABOLITES OF BENZO(A)PYRENE PRODUCED BY CELLS FROM HAMSTERS SUSCEPTIBLE TO CHEMICAL CARCINOGENESIS.
APTIC-25968 07

CATCOTT, E. J.
THE PUBLIC HEALTH SIGNIFICANCE OF ATMOSPHERIC LEAD.
APTIC-25991 07

CAUER, H.
SOME PROBLEMS OF ATMOSPHERIC CHEMISTRY.
APTIC-25925 03

CAYROL, E.
STUDY OF PULMONARY DUST DEPOSITS WITH ELECTRON MICROSCOPE AND MICROANALYSIS WITH AN ELECTRONIC PROBE.
APTIC-26110 07

CERMAKOVA, D.
CURRENT PROBLEMS OF THE THEORY OF ATMOSPHERIC CORROSION.
APTIC-25937 09

CERMAK, J. E.
LABORATORY SIMULATION OF THE ATMOSPHERIC BOUNDARY LAYER.
APTIC-25981 05

CHAFFEE, R. R. J.
STUDIES ON THE COMBINED EFFECTS OF OZONE AND A HOT ENVIRONMENT ON REACTION TIME IN SUBHUMAN PRIMATES.
APTIC-25579 07

CHAKRABARTI, C. L.
ATOMIC ABSORPTION SPECTROSCOPY OF ALUMINUM.
APTIC-26098 03

CHALLEN, PETER J. R.
THRESHOLD LIMIT VALUES FOR CARBON MONOXIDE.
APTIC-26103 11

CHAMBERS, LESLIE A.
MOTOR EXHAUST COMPOSITION IN RELATION TO SELECTED FUELS.
APTIC-24729 01

CHAMPAGNE, JEAN P.
SULFUR EXTRACTION USING TRICHLOROETHYLENE IN PRESENCE OF LIMESTONE, TRONA, AND SODA ASH.
APTIC-25552 02

CHANDLER, K. A.
SURVEY OF CORROSION AND ATMOSPHERIC POLLUTION IN AND AROUND SHEFFIELD.
APTIC-25848 09

CHANDLER, MARTIN W.
RISE AND GROWTH OF SPACE VEHICLE ENGINE EXHAUST AND ASSOCIATED DIFFUSION MODELS.
APTIC-25685 05

CHARLES, HOYT
MONITORING OF FLUORIDE CONTENT OF AIR, WATER, AND VEGETATION.
APTIC-24801 04

CHARLSON, R.
DISCUSSION OF PAPER BY J. KROENING AND E. P. NEY, 'ATMOSPHERIC OZONE.'
APTIC-24775 05

CHASE, J. O.
MEASURING GASEOUS EMISSIONS FROM AN AIRCRAFT TURBINE ENGINE.
APTIC-24745 03

CHATIGNY, M. A.
POLLUTANT MEASUREMENT AND MONITORING INSTRUMENTATION TASK FORCE ASSESSMENT.
APTIC-26275 03

CHATOT, G.
STUDY OF THE ATMOSPHERIC POLYCYCLIC HYDROCARBONS. I. PROBLEMS CONNECTED WITH THE COUPLING OF THIN-LAYER CHROMATOGRAPHY AND GAS CHROMATOGRAPHY.
APTIC-24705 03

CHENG, SHANG-I
REMOVAL OF LEAD FROM AUTOMOBILE EXHAUSTS BY MOLTEN SALTS.
APTIC-26064 02

CHEN, SHINTO
EFFECTS ON RAT OF CHRONC EXPOSURE OF LOW CONCENTRATION OF CO. PART I.
APTIC-26113 07

CHEREDNICHENKO, I. F.
REACTION OF TREES AND SHRUBBERY TO AIR POLLUTION IN THE FOREST-PARK BELT OF MOSCOW AND MEASURES FOR EXTENDING THE LIFESPAN OF PLANTS.
APTIC-24733 08

CHERSTVOVA, V. B.
LIQUIDUS CURVE OF THE GA-SE-TE SYSTEMS.
APTIC-25675 06

CHERTKOV, B. A.
PH VALUE OF AMMONIUM SULFITE-BISULFITE SOLUTIONS.
APTIC-24895 02

CHESTER, R.
ATMOSPHERIC DUST. COLLECTED OFF THE WEST AFRICAN COAST.
APTIC-26016 04

CHIN, H. C.
METEOROLOGICAL ASPECTS OF AIR POLLUTION AND SIMULATION MODELS OF DIFFUSION, TRANSPORT AND REACTIONS OF AIR POLLUTION TASK FORCE ASSESSMENT.
APTIC-26222 05

CHOLAK, J.
CURRENT INFORMATION ON THE QUANTITIES OF FLUORIDE FOUND IN AIR, FOOD, AND WATER.
APTIC-25806 03

CHOW, TSAIHWA J.
BIOGEOCHEMICAL IMPLICATIONS OF LEAD IN THE HYDROSPHERE.
APTIC-26224 08

CHRISTENSEN, H. E.
A SENSITIVE PROCEDURE FOR DETERMINING CARBON MONOXIDE IN BLOOD OR TISSUE UTILIZING GAS-SOLID CHROMATOGRAPHY.
APTIC-26252 07

CHUONG, B. T.
ATTEMPT TO DEFINE THE EXPOSURE LIMITS OF CONCENTRATION FOR SO2, CL2, H2S, AND THE NITROGEN OXIDES IN AN URBAN ATMOSPHERE.
APTIC-24941 11

CHU, ROLAND T.
RISE AND GROWTH OF SPACE VEHICLE ENGINE EXHAUST AND ASSOCIATED DIFFUSION MODELS.
APTIC-25685 05

CICERO, RAUL
AIR POLLUTION VI. BRONCHIAL-PULMONARY ALTERATIONS CAUSED BY AIR POLLUTION.
APTIC-24660 07

CLANCEY, JAMES T.
PIPELINE GAS FROM LIGNITE GASIFICATION CURRENT COMMERCIAL ECONOMICS.
APTIC-24727 10

CLARY, M.
AECIOSPORE RELEASE IN GYMNOSPORANGIUM.
APTIC-26161 01

CLAUZEL, A. M.
TRANSFER VALUES OF CARBON MONOXIDE IN NORMAL HUMANS IN A STABLE VENTILATION STATE AT REST.
APTIC-24931 06

CLAYTON, GEORGE D.
INSTRUMENTATION AND ANALYTICAL TECHNIQUES FOR THE CONTINUOUS DETERMINATICN OF AIR CONTAMINANTS.
APTIC-24927 03

CLELLAND, RICHARD C.
ECOLOGICAL STATISTICAL STUDIES CONCERNING ENVIRONMENTAL POLLUTION AND CHRONIC DISEASE.
APTIC-25873 07

CLEMENTS, JOHN B.
THE NATIONAL AEROMETRIC DATA BANK.
APTIC-24121 04

COATES, VARY TAYLOR
EXAMPLES OF TECHNOLOGY ASSESSMENTS FOR THE FEDERAL GOVERNMENT.
APTIC-24604 12

COENEN, WILFRIED
REPRESENTATION OF PARTICLE-SIZE DISTRIBUTIONS BY MEANS OF A SIMPLE SPECTROMETER AS AN ACCESSORY TO SCATTERED LIGHT MEASURING DEVICES.
APTIC-26062 03

COLCLOUGH, T. P.
SULFUR IN IRON- AND STEELMAKING.
APTIC-24928 01

COLLINS JR, T. T.
OXIDATION OF KRAFT BLACK LIQUOR -- WHERE DOES IT STAND
APTIC-26172 02

COLLINSON, CHARLOTTE
OZONE AND LIPID PEROXIDATION.
APTIC-24953 07

COMMINS, B. T.
CARBON MONOXIDE IN TOWN AIR AN INTERIM REPORT.
APTIC-25799 04

COONS, JOSEPH D.
AIR POLLUTION AND GOVERNMENT STRUCTURE.
APTIC-25763 12

COOPER, R. C.
OCCURRENCE OF AIRBORNE LEAD IN SAN FRANCISCO BAY AND ITS RELATION TO ANIMAL DISEASE.
APTIC-25967 08

CORMIS, L. DE
COMPARISON OF THE EFFECTS OF SULPHUR DIOXIDE AND OF THE DERIVATIVES OF FLUORINE ON A FEW PLANTS.
APTIC-24852 08

CORRSIN, STANLEY
CONJECTURE ON A CONNECTION BETWEEN LIFT AND PARTICLE DISPLACEMENT.
APTIC-24882 06

COSTONIS, ARTHUR CHARLES
THE RELATIONSHIPS OF OZONE, LOPHODERMIUM PINASTRI AND PULLULARIA PULLULANS TO NEEDLE BLIGHT OF EASTERN WHITE PINE.
APTIC-24796 08

COUDRAY, P.
INCIDENCE OF CHRONIC BRONCHITIS AND OF RESPIRATORY INSUFFICIENCY IN AN INDUSTRIAL RURAL POPULATION.
APTIC-25875 07

AIR POLLUTION BY CARBON MONOXIDE AT BORDEAUX.
APTIC-26013 04

COUPE, M.
ON THE INTERCELLULAR NITRATE IN THE LEAVES AND ROOTS OF BARLEY.
APTIC-24850 08

COVENTRY, DALE H.
CHATTANOOGA, TENNESSEE -- ROSSVILLE, GEORGIA INTERSTATE AIR QUALITY STUDY 1967-1968.
APTIC-26086 04

COX, GEOFFREY E.
BOILERS AND THE CLEAN AIR ACTS.
APTIC-24828 12

CRABAUGH, HOYT R.
RESEARCH FINDINGS IN STANDARDS OF INCINERATOR DESIGN.
APTIC-24767 02

CRAIG, H.
OXYGEN-18 VARIATIONS IN ATMOSPHERIC CARBON DIOXIDE THE MASL DATA.
APTIC-26077 05

CRAIG, J. C.
POLLUTANT MEASUREMENT AND MONITORING INSTRUMENTATION TASK FORCE ASSESSMENT.
APTIC-26275 03

CRAMER, HARRISON E.
METEOROLOGICAL INSTRUMENTATION FOR AIR POLLUTION APPLICATIONS.
APTIC-25764 05

CRAMER, H. E.
ANALYSIS OF LOWER ATMOSPHERIC DATA FOR DIFFUSION STUDIES. (FINAL REPORT).
APTIC-24761 05

CRANE, S. C.
HEALING IN RAT LUNG AFTER SUBACUTE EXPOSURE TO NITROGEN DIOXIDE.
APTIC-25759 07

CRAWFORD, A. R.
SYSTEMS STUDY OF NITROGEN OXIDE CONTROL METHODS FOR STATIONARY SOURCES.
APTIC-12619 02

CONTROL OF NITROGEN OXIDE EMISSIONS FROM STATIONARY COMBUSTION SOURCES.
APTIC-24678 02

CRAWFORD, TODD V.
THE LONG RANGE DIFFUSION OF THE EFFLUENT CLOUD FROM THE PHOEBUS 1B EP-IV REACTOR TEST OF FEBRUARY 23, 1967.
APTIC-26192 05

CREASON, JOHN P.
NITROGEN DIOXIDE AND LOWER RESPIRATORY ILLNESS.
APTIC-25966 C7

CREER, RALPH N.
DIFFERENTIAL RESPONSES TO AIR POLLUTION AS AN ENVIRONMENTAL HEALTH PROBLEM.
APTIC-26303 13

CREMER, JILL E.
BIOCHEMICAL STUDIES ON THE TOXICITY OF TETRAETHYL LEAD AND OTHER ORGANO-LEAD COMPOUNDS.
APTIC-25847 07

CRESWICK, FREDERICK A.
AIR POLLUTION FROM MOTOR VEHICLES.
APTIC-25886 02

CRIDER, W. L.
THE DYNAMIC BEHAVIOR OF AEROSOLS.
APTIC-25779 06

CROCKER, T. TIMOTHY
INTERACTION OF BENZO(A)PYRENE (BAP) WITH MAMMALIAN CELLS IN CULTURE.
APTIC-25850 07

CROSSMON, GERMAIN C.
MICROSCOPIC IDENTIFICATION OF TOXIC DUSTS.
APTIC-25970 03

DAMON, W. A.
ABATEMENT OF AIR POLLUTION IN THE CHEMICAL INDUSTRY.
APTIC-24743 01

DANA, M. TERRY
PRECIPITATION CHARACTERISTICS SHIPBOARD MEASUREMENTS IN THE CARIBBEAN SEA.
APTIC-26162 05

DARBY, K.
CHARACTERISTICS OF ELECTROSTATIC PRECIPITATORS.
APTIC-25641 02

EFFICIENCY OF ELECTROSTATIC PRECIPITATORS AS AFFECTED BY THE PROPERTIES AND COMBUSTION OF COAL.
APTIC-25786 02

ELECTROSTATIC PRECIPITATION FOR LARGE BOILERS.
APTIC-25833 02

DARLEY, ELLIS F.
INVESTIGATION ON INJURY TO PLANTS FROM AIR POLLUTION IN THE LOS ANGELES AREA.
APTIC-26146 08

DARLEY, E. F.
ON THE STABILITY OF ACROLEIN TOWARDS PHOTO-OXIDATION IN THE NEAR ULTRAVIOLET.
APTIC-25630 05

DAVIDKOVA, E.
FEATURES OF A COMBINED ACTION OF SULFUROUS GAS AND CARBON MONOXIDE IN THEIR JOINT PRESENCE IN THE ATMOSPHERE.
APTIC-25790 07

DAVIDSON, W. F.
A STUDY OF ATMOSPHERIC POLLUTION.
APTIC-24945 04

APTIC-24945 04

DAVIES, C. N.
PROBLEMS IN AEROSOL FILTRATION.
APTIC-25539 02

DAVIES, THEODORE E.
FLAME GRID AND COMPONENT PARTS THEREOF.
APTIC-23819 02

DAVIS, DONALD D.
AIR POLLUTION AND SOUTHERN FORESTS.
APTIC-25769 08

DAVIS, R. J.
AEROSOL STUDIES IN THE REACTOR SAFETY PROGRAM AT OAK RIDGE NATIONAL LABORATORY.
APTIC-24875 01

DAWBARN, HENRY D.
METHOD FOR DEPOSITING PARTICLES.
APTIC-25569 02

DE MOOIJ, H.
AIR POLLUTION FROM SOLDERING FUMES.
APTIC-25624 07

DEL GUERRA, M.
PRODUCTION OF CARBON DISULFIDE FROM METHANE AND SULFUR DIOXIDE.
APTIC-24596 06

DEMAGNY, J.
THE MANUFACTURE OF PURE SULFUR DIOXIDE AND SULFUR FROM GASES CONTAINING SMALL AMOUNTS OF SULFUR.
APTIC-25670 02

DEMING, GARY M.
UNDERSTANDING AIR CLEANER RATING METHODS AIDS ACCURATE SELECTION AND APPLICATION.
APTIC-24872 02

DEMING, LOLA S.
THE THEORETICAL CALCULATION OF THE DISTRIBUTION OF PHOTOCHEMICALLY-FORMED OZONE IN THE ATMOSPHERE.
APTIC-25924 05

DENARDO, JOSEPH W.
FORECASTING COH LEVELS AT SIX OUTLYING SAMPLING STATIONS IN ALLEGHENY COUNTY USING STATISTICAL CORRELATIONS DERIVED FROM THE DOWNTOWN STATION.
APTIC-26280 05

DEQUASIE, HENRY L.
STABLE ISOTOPES APPLIED TO POLLUTION STUDIES.
APTIC-26123 03

DERKA, JAROSLAV
A PROCESS FOR REMOVING SULPHUR DIOXIDE FROM WASTE GASES.
APTIC-26246 02

DESIDERATI, PAUL
ODOR CONTROL WITH CHLORINE CUTS COST.
APTIC-25623 02

DEUGASIEWICZ, MARIA
THE DEATH RATE DUE TO LUNG CANCER IN PEOPLE LIVING IN SELECTED TOWNS IN POLAND IN THE POLLUTION OF THE ATMOSPHERE.
APTIC-24935 07

DEWEES, DONALD N.
AUTOMOTIVE POLLUTION CONTROL.
APTIC-23390 12

DICKENS, F.
INTRATRACHEAL ADMINISTRATION OF DUST PARTICLES AND CARCINOGENS IN RATS.
APTIC-26099 07

DIETRICH, LEO
DUST AS RAW MATERIAL AS A SOURCE OF LOSS AND OF GAIN.
APTIC-26239 10

DIETRICH, R.
A COMPARISON OF METHODS FOR TESTING THE FASTNESS TO GAS FADING OF DYES ON ACETATE.
APTIC-26167 03

DIETZE, H.-J.
DUST FALL IN THE VICINITY OF CEMENT FACTORIES AS IT RELATES TO POSSIBLE HEALTH HAZARDS PART 2.
APTIC-24708 07

DINGWALL-FORDYCE, I.
A FOLLOW-UP STUDY OF LEAD WORKERS.
APTIC-26177 07

DMITRIEV, M. T.
IONIZATION-CHROMATOGRAPHIC DETERMINATION OF NITRILES IN THE 6ATMOSPHERE.
APTIC-24693 03

DMITRIYEVA, G. V.
THE USE OF RADIOACTIVE TRACERS IN QUANTITATIVE STUDIES OF MOVEMENTS OF THE ATMOSPHERE.
APTIC-25842 05

DOERR, KARL-HEINZ
PRODUCTION OF SULFUR TRIOXIDE AND SULFURIC ACID.
APTIC-24628 02

DOETSCH, ERWIN
CONTRIBUTION TO THE THEORY OF ELECTRICAL CHARGING OF AN AEROSOL.
APTIC-25980 06

DOMINGUEZ, ABEL M.
PSYCHOPHARMACOLOGY OF CARBON MONOXIDE UNDER AMBIENT AND ALTITUDE CONDITIONS.
APTIC-24958 07

DOMINGUEZ, A. M.
A SENSITIVE PROCEDURE FOR DETERMINING CARBON MONOXIDE IN BLOOD OR TISSUE UTILIZING GAS-SOLID CHROMATOGRAPHY.
APTIC-26252 07

DONETSKAYA, L. E.
DEVELOPMENT OF MOLECULAR CONDENSATION NUCLEI AND CONDITIONS FOR ITS OBSERVATION.
APTIC-24764 06

DORRIES, WILHELM
ORIGINAL TREATISES CONCERNING THE USABILITY OF THE SPECTROSCOPIC PHAOPHYTIN-TEST IN SMOKE-DAMAGE DIAGNOSIS.
APTIC-24851 08

DOVE, LAWRENCE O.
AIR POLLUTION CONTROL DEVICE FOR ENGINES.
APTIC-25566 02

DOWLING, FRED B.
ATOMIC ABSORPTION SPECTROSCOPY OF ALUMINUM.
APTIC-26098 03

DOWNING, PAUL B.
INTRODUCTION AND RESEARCH RECOMMENDATIONS.
APTIC-25839 13

DOYLE, GEORGE J.
DESIGN OF A FACILITY (SMOG CHAMBER) FOR STUDYING PHOTOCHEMICAL REACTIONS UNDER SIMULATED TROPOSPHERIC CONDITIONS.
APTIC-24659 03

DRATWA, HEINRICH

DESULFURIZATION OF FLUE GAS WITH ADSORPTION COKE OF VARIABLE PROPERTIES.
APTIC-24709 02

DRECHSEL, HERBERT
PRODUCTION OF SULFUR TRIOXIDE AND SULFURIC ACID.
APTIC-24620 02

DREFAHL, BARBARA
INDUSTRIAL ENVIRONMENT CHEMICALS, OCCURRENCE, DECOMPOSITION AND CONSEQUENCES.
APTIC-25059 01

DRINKER, PHILIP
AIR POLLUTION PROBLEMS IN THE UNITED STATES.
APTIC-24039 01

DRODTEN, PETER
CORROSION BEHAVIOR OF CAST IRON IN RURAL, MARINE AND INDUSTRIAL ATMOSPHERES AND IN SEA WATER.
APTIC-25584 09

DRUETT, H. A.
TOXICITY OF OPEN AIR TO A VARIETY OF MICROOGANISMS.
APTIC-25698 08

DUCKWORTH, J. B.
AUTOMOTIVE STARTING AND WARM-UP RESPOND TO GASOLINE VOLATILITY.
APTIC-25931 01

DUFFEE, R. A.
A TRACER TECHNIQUE TO MEASURE DEPOSITION OF STACK EMISSIONS.
APTIC-26139 03

DUGGER JR, W. M.
ANTHOCYANIN FORMATION AS A RESPONSE TO OZONE AND SMOG TREATMENT IN RUMEX CRISPUS L.
APTIC-24883 08

DUMBAULD, R. K.
ANALYSIS OF LOWER ATMOSPHERIC DATA FOR DIFFUSION STUDIES. (FINAL REPORT).
APTIC-24761 05

DUNCAN, S. P.
EFFECT OF FILTER MEDIA MICROSTRUCTURE ON DUST COLLECTION.
APTIC-25960 02

DUNGLER, JULIEN
ELECTROSTATIC FILTER FOR THE PURIFICATION OF GASES AND PARTICULARLY OF THE AIR.
APTIC-25733 02

DUNMIRE, PAUL C.
SMOKE ABATEMENT DEVICE.
APTIC-25716 02

DURIE, R. A.
FACTORS INFLUENCING THE EFFICIENT OPERATION OF ELECTROSTATIC PRECIPITATORS FOR PULVERISED-FUEL ASH.
APTIC-24630 02

DWYER, H. A.
A STUDY OF THE MECHANICS OF TURBULENT GAS-SOLID SHEAR FLOWS.
APTIC-25657 06

DYCKERHOFF, G. A.
SEDIMENTATION OF POWDERED SOLIDS.
APTIC-24973 06

EASLEY, W. C.
AN IMPROVED CONTAMINANT SENSING TECHNIQUE FOR LABORATORY AND SPACECRAFT APPLICATION.
APTIC-24959 03

EBENHOECH, FRANZ LUDWIG
CATALYTIC REACTION OF CARBON MONOXIDE WITH STEAM.
APTIC-25700 02

EDELMAN, SIDNEY
AIR POLLUTION ABATEMENT PROCEDURES UNDER THE CLEAN AIR ACT.
APTIC-24948 12

EDINGER, J. C.
POLLUTANT MEASUREMENT AND MONITORING INSTRUMENTATION TASK FORCE ASSESSMENT.
APTIC-26275 03

EDINGER, J. G.
METEOROLOGICAL ASPECTS OF AIR POLLUTION AND SIMULATION MODELS OF DIFFUSION, TRANSPORT AND REACTIONS OF AIR POLLUTION TASK FORCE ASSESSMENT.
APTIC-26222 05

EDQVIST, O.
THE PHOTOELECTRON SPECTRA OF O2, N2 AND CO.
APTIC-24889 06

EGE JR, JOHN F.
A FILTER PAPER METHOD FOR LEAD FUME COLLECTION.
APTIC-25793 03

EGGER, K. W.
KINETIC EVIDENCE CONCERNING THE GEOMETRY OF SUBSTITUTED METHYL RADICALS.
APTIC-25985 06

EGI, KOZO
TRICKLING PACKED BED REACTORS.
APTIC-26065 02

EGLEY, BILLY D.
SELECTION OF GAS CLEANING EQUIPMENT FOR AN ORE PREPARATION PLANT.
APTIC-24676 02

EHMANN, WILLIAM N.
THE REACTION OF ORGANIC ANIONS WITH CARBON MONOXIDE. (FINAL REPORT).
APTIC-25852 06

EINBRODT, H. J.
DUST FALL IN THE VICINITY OF CEMENT FACTORIES AS IT RELATES TO POSSIBLE HEALTH HAZARDS PART 2.
APTIC-24708 07

EISENBUD, MERRIL
ENVIRONMENTAL PROTECTION IN THE CITY OF NEW YORK.
APTIC-24636 12

EISENSTADT, H. B.
ASBESTOS PLEURISY.
APTIC-25844 07

ELBERT, WALTER C.
POLYNUCLEAR AROMATIC HYDROCARBON COMPOSITION OF THE ATMOSPHERE IN SOME LARGE AMERICAN CITIES.
APTIC-25693 04

ELDERKIN, C. E.
ATMOSPHERIC PHYSICS. ATMOSPHERIC DIFFUSION, DEPOSITION, AND TRANSPORT. (ANNUAL REPORT).
APTIC-24962 05

ELSEY, HOWARD M.
AIR HUMIDITY AND BRUSH CONTACT DROP THE EFFECT OF WATER VAPOR, SULFUR DIOXIDE, AND HYDROGEN SULFIDE.
APTIC-24943 09

ENDO, R.
A NEW DEVICE FOR CONTINUOUS DETERMINATION OF SULFUR DIOXIDE.
APTIC-26120 03

ENDO, T.
REMOVAL OF ODOR OF ORGANIC SOLVENT AND UTILIZATION OF RECOVERED HEAT BY U.O.P. CATALYTIC COMBUSTION SYSTEM.
APTIC-26308 02

ENGELMANN, R. J.
THE CALCULATION OF PRECIPITATION SCAVENGING.
APTIC-24956 05

CALCULATION OF PRECIPITATION SCAVENGING OF PARTICULATES AND GASES FROM THE ATMOSPHERE.
APTIC-25951 05

ENGELS, G.
GERMAN FOUNDRY EXPERIENCE IN CUPOLA DUST EMISSION AND EMISSION CONTROL.
APTIC-24674 02

ENGLE JR, P. M.
CHARACTERISTICS AND APPLICATION OF HIGH PERFORMANCE DRY FILTERS.
APTIC-25766 02

ENOSHIMA, K.
A STATISITICAL STUDY ON VISIBILITY FORECASTING (PART I).
APTIC-22403 05

EPSHTEIN, E. M.
ON THE INTERACTION OF AEROSOL PARTICLES WITH ACOUSTIC WAVE IN THE PRESENCE OF HIGH FREQUENCY ELECTRIC FIELD.
APTIC-24624 06

ERDMANN, ROBERT C.
POWER CONTROL OF RADIOACTIVE EMISSIONS FROM NUCLEAR REACTORS.
APTIC-25975 01

ERHARDT, CARL
INTERMITTENT AIR POLLUTION EPISODE IN NEW YORK CITY, 1962.
APTIC-25829 07

ERIKSSON, ERIK
THE IMPORTANCE OF INVESTIGATING GLOBAL BACKGROUND POLLUTION.
APTIC-23959 04

ERIN, S. A.
AN EXPRESS DETERMINATION OF OZONE CONCENTRATION IN THE AIR.
APTIC-24691 03

ESSENHIGH, R. H.
PROPAGATION VELOCITY AND FLAME SPREAD THROUGH SIMULATED FUEL BEDS.
APTIC-25989 06

ESTES, FRANCES L.
DETERMINATION OF 2-NITROPROPANE AND OF NITRITE IN MIXTURES.
APTIC-25824 03

ULTRAVIOLET ABSORPTION OF ALIPHATIC NITRO COMPOUNDS IN THE PRESENCE OF A BASE.
APTIC-25948 03

ETTINGER, HARRY J.
EFFICIENCY OF IPC-1478 FILTER PAPER AGAINST POLYSTYRENE LATEX AND DIOCTYL PHTHALATE AEROSOLS.
APTIC-22190 03

CALIBRATION OF A TWO-STAGE AIR SAMPLER.

APTIC-22722 03

EVERALL, P. F.
THE EXCESS FUEL CONSUMED BY CARS WHEN STARTING FROM COLD.
APTIC-24605 01

FAATZ, ALBERT C.
A CENTRALIZED INCINERATION FACILITY FOR INDUSTRIAL WASTE DISPOSAL.
APTIC-26204 02

FAIRHALL, LAWRENCE T.
THE ABSOLUTE EFFICIENCY OF THE IMPINGER AND OF THE ELECTROSTATIC PRECIPITATOR IN THE SAMPLING OF AIR CONTAINING METALLIC LEAD FUME.
APTIC-26145 03

FAIRS, G. LOWRIE
HIGH-EFFICIENCY FIBRE FILTERS FOR THE TREATMENT OF FINE MISTS.
APTIC-24695 02

FAIR, DONALD H.
THE NATIONAL AEROMETRIC DATA BANK.
APTIC-24121 04

FAITH, LARRY EUGENE
ANALYSIS OF SPACE-CHARGE PRECIPITATION.
APTIC-24794 02

FAITH, W. L.
A SUGGESTED PROGRAM FOR THE SACRAMENTO REGION.
APTIC-24059 12

FALK, HANS L.
CARCINOGENIC HYDROCARBONS AND RELATED COMPOUNDS IN PROCESSED RUBBER.
APTIC-24629 01

APTIC-24629 01

INHIBITION OF CARCINOGENESIS.
APTIC-25845 07

FAN, LOH-NIEN
TURBULENT BUOYANT JETS INTO STRATIFIED OR FLOWING AMBIENT FLUIDS.
APTIC-24797 06

FARR, T. D.
FLUORIDE RECOVERY FROM PHOSPHORUS PRODUCTION.
APTIC-24834 02

FASCHING, G. E.
METER FOR DETERMINING MASS FLOW OF SOLIDS IN MULTI-PHASE FLUIDS.
APTIC-24590 06

FAUSTOV, A. S.
EFFECTS OF CERTAIN CHEMICAL SUBSTANCES ON PROTEIN CONTENT OF BLOOD SERUM AND OF BONE MARROW.
APTIC-25738 07

FEHR, ROLAND
THE OXOSYNTHESIS OF PROPIONIC ALDEHYDE IN A THIN LAYER REACTOR.
APTIC-25830 06

FELDKIRCHER, JAMES J.
REBIRTH OF A BOILERHOUSE.
APTIC-24854 02

FELDSTEIN, MILTON
STUDIES ON THE ANALYSIS OF HYDROCARBONS FROM INCINERATOR EFFLUENTS WITH A COMBUSTIBLE GAS INDICATOR.
APTIC-25696 03

FERBER, B. I.
RESPIRATOR FILTER PENETRATION USING SODIUM CHLORIDE AEROSOL.
APTIC-25611 03

FERRIS JR, BENJAMIN G.
TESTS TO ASSESS EFFECTS OF LOW LEVELS OF AIR POLLUTANTS ON HUMAN HEALTH.
APTIC-25874 07

FERRIS, BENJAMIN G.
EFFECTS OF AIR POLLUTION ON SCHOOL ABSENCES AND DIFFERENCES IN LUNG FUNCTION IN FIRST AND SECOND GRADERS IN BERLIN, NEW HAMPSHIRE, JANUARY 1966 TO JUNE 1967.
APTIC-25563 07

FIELD, EDWIN L.
TACKLING THE PROBLEM OF NITROGEN OXIDES.
APTIC-24922 02

FIELD, FRANKLYN
INTERMITTENT AIR POLLUTION EPISODE IN NEW YORK CITY, 1962.
APTIC-25829 07

AREA METEOROLOGY.
APTIC-25855 05

FIELD, J. H.
NEW POTENTIAL ABSORBENTS FOR SULFUR OXIDES REMOVAL FROM FLUE GAS.
APTIC-24932 02

FINKLEA, JOHN F.
NITROGEN DIOXIDE AND LOWER RESPIRATORY ILLNESS.
APTIC-25966 07

FINKLEA, J. F.
HAIR TRACE METAL LEVELS AND ENVIRONMENTAL EXPOSURE.
APTIC-24716 07

FINK, MARTIN R.
FILTER FRAME SEAL.
APTIC-25571 02

FIOLETOVA, E. A.
COMPLEXOMETRIC DETERMINATION OF SULFUR TRIOXIDE AND SULFUR DIOXIDE IN WASTE PROCESS GASES.
APTIC-26067 03

FISCHER, FRIEDRICH
A PROCESS FOR THE REMOVAL OF SULFUR COMPOUNDS FROM HOT CRACKING GAS.
APTIC-24749 02

FISHER, HENRY B.
PRODUCTION OF SOUR GAS-SULFUR WELLS EMPLOYING A SULFUR SOLVENT.
APTIC-25708 02

FITT, THEODORE CLEON
PROCESS FOR THE CONVERSION OF HYDROGEN SULFIDE WITH SULFUR DIOXIDE TO ELEMENTARY SULFUR.
APTIC-24751 02

FITZSIMMONS, A. E.
THE DESIGN AND CONSTRUCTION OF A PHOTOELECTRONIC SCANNING MACHINE FOR SIZING MICROSCOPIC PARTICLES.
APTIC-25943 03

FLEMING, EDWARD P.
PROCESS FOR THE CONVERSION OF HYDROGEN SULFIDE WITH SULFUR DIOXIDE TO ELEMENTARY SULFUR.
APTIC-24751 02

FLIEGEL, H. F.
THE WAVELENGTH DEPENDENCE OF ATMOSPHERIC EXTINCTION.
APTIC-24658 05

FLOWERS, E. C.
ATMOSPHERIC TURBIDITY OVER THE UNITED STATES, 1961-1966.
APTIC-12595 05

FOLLET, ROSS C.
AIR POLLUTION A SOCIOLOGICAL PERSPECTIVE.
APTIC-25983 13

FONTANGES, R.
STUDY OF THE ATMOSPHERIC POLYCYCLIC HYDROCARBONS. I. PROBLEMS CONNECTED WITH THE COUPLING OF THIN-LAYER CHROMATOGRAPHY AND GAS CHROMATOGRAPHY.
APTIC-24705 03

FONTIJN, ARTHUR
CHEMILUMINESCENT METHOD OF DETECTING OZONE.
APTIC-25710 03

FORESTER, G.
POLLUTANT MEASUREMENT AND MONITORING INSTRUMENTATION TASK FORCE ASSESSMENT.
APTIC-26275 03

FORREST, J. S.
PRESENT PERFORMANCE AND SCOPE FOR IMPROVEMENT IN POWER-STATION ELECTROSTATIC PRECIPITATORS.
APTIC-26143 02

FOWLER, DOUGLAS P.
HEALTH EFFECTS OF PARTICULATE AIR POLLUTION CHARACTERIZATION OF COMPACT AND FIBROUS COMPONENTS.
APTIC-25582 03

FOX, FRANK T.
POLYNUCLEAR AROMATIC HYDROCARBON COMPOSITION OF THE ATMOSPHERE IN SOME LARGE AMERICAN CITIES.
APTIC-25693 04

FRANCIS, W.
FLUE-GAS WASHING PROCESS. PART TWO.
APTIC-24697 02

FLUE-GAS WASHING PROCESSES. PART THREE.
APTIC-24737 02

FRANKENBERG, T. T.
REMOVAL OF SULFUR FROM FUELS AND PRODUCTS OF COMBUSTION.
APTIC-25961 02

FRANTISAK, F.
ONTARIO'S AIR POLLUTION INDEX.
APTIC-24635 04

FRANZKY, U.
RESULTS OF THERMAL AND OF CATALYTIC PROCESSES TO LIMIT OLFACTORY EMISSIONS OF ORGANIC CHEMICAL COMPOUNDS.
APTIC-24754 02

FREDRIKSEN, HELGE
CAN EMISSIONS BE REDUCED
APTIC-25584 02

FREEMAN, G.
HEALING IN RAT LUNG AFTER SUBACUTE EXPOSURE TO NITROGEN DIOXIDE.
APTIC-25759 07

FREOUR, P.

INCIDENCE OF CHRONIC BRONCHITIS AND OF RESPIRATORY
INSUFFICIENCY IN AN INDUSTRIAL RURAL POPULATION.
APTIC-25875 07

AIR POLLUTION BY CARBON MONOXIDE AT BORDEAUX.
APTIC-26013 04

FRESH, J. W.
NASOPHARYNGEAL CARCINOMA AND ENVIRONMENTAL CARCINOGENS.
APTIC-24880 07

FREY, ALLAN H.
HUMAN BEHAVIOR AND ATMOSPHERIC IONS.
APTIC-26149 07

FRIEDLANDER, GORDON D.
POWER, POLLUTION, AND THE IMPERILED ENVIRONMENT. II. EAST,
MIDWEST, AND WEST COAST POLLUTION-CONTROL PLANS OF SOME
MAJOR UTILITIES ROLE OF GOVERNMENT IN ENVIRONMENTAL
MATTERS OTHER PROPOSED SYSTEMS FOR REDUCING STACK
EMISSIONS.
APTIC-25867 02

FRIEDRICHS, HANS-ADOLF
CONTRIBUTION TO THE THEORY OF ELECTRICAL CHARGING OF AN
AEROSOL.
APTIC-25980 06

FRIZZOLA, J. A.
THE RISE OF BOUYANT CLOUDS.
APTIC-25819 05

FRONDIZI, C. A.
THE EFFECTS OF LEAD ADDITIVES ON REACTIONS IN EXHAUST
SYSTEMS.
APTIC-25581 01

FUCHS, WERNER
A METHOD OF OXIDIZING HYDROGEN SULFIDE TO ELEMENTARY SULFUR.
APTIC-24752 02

FUERST, ERNST
PROCESS FOR THE REMOVAL AND RECLAMATION OF SULFUR DIOXIDE
FROM FLUE GASES.
APTIC-26164 02

FUJIBAYASHI, KOICHI
ELECTRODYNAMIC BEHAVIOR OF CHARGED AEROSOL PARTICLES IN AN
INHOMOGENEOUS ALTERNATING FIELD AND POSSIBILITIES OF ITS
APPLICATION IN DUST ENGINEERING.
APTIC-26041 06

FUJISAWA, K.
LOW VOLUME AIR SAMPLER RESEARCH ON THE MEASUREMENT OF THE
PARTICULATES IN THE AIR WITH LOW VOLUME AIR SAMPLER.
APTIC-26007 03

FUJITA, TADASHI
VENTILATION OF POLLUTED AIR IN ROOMS. VIII. STUDIES ON
THEORETICAL EQUATIONS FOR VENTILATION OF POLLUTED AIR
DIFFUSED HETEROGENEOUSLY IN ROOM.
APTIC-24647 06

FUJIWARA, TAKASHI
SENSITIVITY OF GRAPEVINES TO INJURY BY ATMOSPHERIC SULFUR
DIOXIDE.
APTIC-25888 08

FUKASE, OSAMU
EFFECTS ON RAT OF CHRONC EXPOSURE OF LOW CONCENTRATION OF
CO. PART I.
APTIC-26113 07

FUKUI, SABURO
A NEW DRY PROCESS OF SO2 REMOVAL FROM FLUE GAS.
APTIC-24589 02

FULLER, W. I.
FOREIGN PROFILES IN AIR POLLUTION CONTROL ACTIVITIES
SPECIAL SOURCES OF INFORMATION.
APTIC-26168 12

FULTON, CHARLES H.
METALLURGICAL SMOKE.
APTIC-25605 02

FUNAKI, TADAKAZU
REPORT ON AIR POLLUTION STUDY (NO. 4).
APTIC-26027 04

FUNK, ANDREW B.
CHEMICAL SUPPRESSION OF NITROGEN OXIDES.
APTIC-25714 02

FUQUAY, J. J.
DEVELOPMENT OF AN ATMOSPHERIC TRANSPORT MODEL.
APTIC-24606 05

ATMOSPHERIC PHYSICS. ATMOSPHERIC DIFFUSION, DEPOSITION, AND
TRANSPORT. (ANNUAL REPORT).
APTIC-24962 05

FURIOSI, N. J.
HEALING IN RAT LUNG AFTER SUBACUTE EXPOSURE TO NITROGEN
DIOXIDE.
APTIC-25759 07

FURUTANI, YASUMASA
CORROSION PRODUCTS IN VARIOUS ENVIRONMENTS.
APTIC-25727 09

FURUTO, K.
DISPOSAL METHOD FOR SULFUROUS ACID CONTAINED IN WASTE GAS.
APTIC-24683 02

FUSE, YOSHIYA
SOME EXPERIMENTS FOR CONT[illegible]LING OF NITROGEN OXIDES IN
DIESEL ENGINE EXHAUST GAS.
APTIC-25507 02

GADSDEN, J. A.
THE DETERMINATION OF CHRYSOTILE IN AIRBORNE ASBESTOS.
APTIC-25656 03

GAESSLER, WILLI
CONSIDERATIONS ON IMPROVING THE ENVIRONMENTAL PROTECTION.
APTIC-26061 12

GAL, P.
STUDY OF PULMONARY DUST DEPOSITS WITH ELECTRON MICROSCOPE
AND MICROANALYSIS WITH AN ELECTRONIC PROBE.
APTIC-26110 07

GAMACHE, LARRY D.
SAMPLE HANDLING SYSTEM FOR AUTO EXHAUST ANALYZER.
APTIC-25732 03

GAMBS, GERARD C.
POWER PLANT ASH--A NEGLECTED ASSET.
APTIC-25689 01

GARDNER, DWIGHT E.
THE EFFECTS OF THE ABSORPTION OF FLUORIDE. V. THE CHEMICAL
DETERMINATION OF FLUORIDE IN HUMAN SOFT TISSUES FOLLOWING
PROLONGED INGESTION OF FLUORIDE AT VARIOUS LEVELS.
APTIC-25946 07

GARTRELL, F. E.
MONITORING OF SO2 IN THE VICINITY OF COAL-FIRED POWER PLANTS
-TVA EXPERIENCES.
APTIC-24913 08

GASPERINI, ENRICO
DE-DUSTING DEVICE FOR SMOKE AND OTHER GASEOUS FLUIDS.
APTIC-25550 02

GAST, JOSEPH H.
ULTRAVIOLET ABSORPTION OF ALIPHATIC NITRO COMPOUNDS IN THE
PRESENCE OF A BASE.
APTIC-25948 03

GAST, THEODOR
A NEW ROAD TO ACCELERATED GRAIN-SIZE ANALYSIS IN THE RANGE
FROM 10 MICRON TO 0.1 MICRON IN DIAMETER.
APTIC-26060 03

GAZARYAN, S. A.
SIMULTANEOUS RECOVERY OF LOW-CONCENTRATION SULFUR OXIDES AND
NITROGEN OXIDES WITH ALKALIES AND CARBONATES. IV.
ABSORPTION WITH MAGNESIUM HYDROXIDE.
APTIC-24704 06

GEBHART, JOSEF
A SCATTERED LIGHT PARTICLE-SIZE SPECTROMETER FOR
SUBMICROSCOPIC AEROSOLS OF HIGH CONCENTRATION.
APTIC-25871 03

GELFMAN, STANLEY
AIR POLLUTANT REMOVAL APPARATUS HAVING HORIZONTAL BED FOR
AIR-LIQUID CONTACT.
APTIC-25885 02

GENDEREN, H. VAN
SEVERAL TYPES OF SIDE-EFFECTS.
APTIC-24667 08

GEORGIYEVSKIY, YU. S.
SPECTRAL TRANSPARENCY OF HAZE IN THE SPECTRAL REGION FROM
0.37 TO 1.0 MICRONS.
APTIC-24805 05

GERARDE, HORACE W.
TOXICOLOGICAL STUDIES ON HYDROCARBONS. IX. THE ASPIRATION
HAZARD AND TOXICITY OF HYDROCARBONS AND HYDROCARBON
MIXTURES.
APTIC-25640 07

GERMA[illegible]SSON, GIDEON
THRESHOLD LIMIT VALUES FOR CARBON MONOXIDE.
APTIC-26103 11

GERHOLD, C. G.
SUMMARY OF STATEMENT OF JOHN O. LOGAN AND C. G. GERHOLD OF
UNIVERSAL OIL PRODUCTS CO., DES PLAINES, ILL., WASHINGTON,
D. C., MARCH 20, 1970.
APTIC-24696 02

GHISONI, PIETRO
ELIMINATION OF ODORS IN A SULPHATE PULP MILL.
APTIC-26176 02

GIBBON, BOB
AIR QUALITY MODEL SIMULATES TORONTO SKIES.
APTIC-25537 05

GIBSON, H. G.
METER FOR DETERMINING MASS FLOW OF SOLIDS IN MULTI-PHASE
FLUIDS.
APTIC-24590 06

GIESLER, ERICH
CATALYTIC REACTION OF CARBON MONOXIDE WITH STEAM.

APTIC-25700 02

GIFFORD JR, F. A.
USE OF ROUTINE METEOROLOGICAL OBSERVATIONS FOR ESTIMATING ATMOSPHERIC DISPERSION.
APTIC-25935 05

GILBERT, GORDON J.
NEUROLOGIC MANIFESTATIONS OF CHRONIC CARBON MONOXIDE POISONING.
APTIC-25695 07

GILBERT, T.
PROTECTION OF ENVIRONMENT.
APTIC-25593 04

GILGEN, A.
AIR POLLUTION AND HEALTH.
APTIC-25556 07

GILL, GERALD C.
A METEOROLOGICALLY OPERATED STACK CONTROL SYSTEM.
APTIC-26148 02

GILL, J. E.
POLLUTANT MEASUREMENT AND MONITORING INSTRUMENTATION TASK FORCE ASSESSMENT.
APTIC-26275 03

GILL, J. S.
AEROSOL STUDIES IN THE REACTOR SAFETY PROGRAM AT OAK RIDGE NATIONAL LABORATORY.
APTIC-24875 01

GILL, W. E.
DETERMINATION OF NO2 AND NO IN AIR.
APTIC-25918 03

GILMORE JR, HUGH B.
URBAN-RURAL DIFFERENCES IN LUNG CANCER MORTALITY RATES IN THE STATE.
APTIC-25849 07

GILMORE, TODD
DEVELOPMENT OF A LASER SYSTEM FOR ABSOLUTE ATMOSPHERIC DIFFUSION MEASUREMENT OF A GASEOUS TRACER MATERIAL. (FINAL REPORT).
APTIC-25936 03

GIRSEWALD, CONWAY FREH. V.
PROCESS FOR OBTAINING ELEMENTAL SULFUR FROM SULFUR DIOXIDE OR GASES CONTAINING IT.
APTIC-23305 02

GIUSTI, GINO P.
THE THERMODYNAMIC PROPERTIES OF SULFUR DIOXIDE.
APTIC-25954 06

GLASER, GILBERT H.
NEUROLOGIC MANIFESTATIONS OF CHRONIC CARBON MONOXIDE POISONING.
APTIC-25695 07

GLASSON, WILLIAM A.
HYDROCARBON REACTIVITIAS IN THE ATMOSPHERIC PHOTOOXIDATION OF NITRIC OXIDE.
APTIC-24660 05

INHIBITION OF ATMOSPHERIC PHOTOOXIDATION OF HYDROCARBONS BY NITRIC OXIDE.
APTIC-24986 05

GLAUS, W. D.
STUDY OF ATMOSPHERIC AND AAP OBJECTIVES OF CROSS-BEAM EXPERIMENTS. (FINAL REPORT).
APTIC-24924 03

GLINKOV, M. A.
CHEMICAL COMPOSITION OF FINELY-DISPERSED DUST FORMED DURING BLOWING OXYGEN THROUGH THE MELT IN THE HEARTH OF A STEEL FURNACE. 1ST COMMUNICATION.
APTIC-26018 02

GOEBBELER, T.
ON THE ROENTGENOLOGICAL DETECTABILITY OF DUST DEPOSITS IN THE LUNGS. STUDIES ON THE ALDERSON-RANDO PHANTOM.
APTIC-18289 06

GOETHERT, W.
CARBON MONOXIDE PARTIAL PRESSURE IN TISSUE OF DIFFERENT ANIMALS.
APTIC-25562 07

GOLDBAUM, L. R.
A SENSITIVE PROCEDURE FOR DETERMINING CARBON MONOXIDE IN BLOOD OR TISSUE UTILIZING GAS-SOLID CHROMATOGRAPHY.
APTIC-26252 07

GOLDBERG, M. S
THE JOINT ACTION OF ATMOSPHERIC POLLUTIONS ON MAN.
APTIC-24688 07

GOLDBERG, STANLEY B.
TOXICITY OF NO2 VAPORS AT VERY LOW LEVELS. A PRELIMINARY REPORT.
APTIC-24588 07

GOLDEN, D. M.
KINETIC EVIDENCE CONCERNING THE GEOMETRY OF SUBSTITUTED METHYL RADICALS.
APTIC-25985 06

GOLDFEIN, SAM
CARCINOGENIC HYDROCARBONS AND RELATED COMPOUNDS IN PROCESSED RUBBER.
APTIC-24629 01

APTIC-24629 01

GOLDSMITH, JOHN R.
POSSIBLE ASSOCIATION OF MOTOR VEHICLE ACCIDENTS WITH POLLUTANT LEVELS IN LOS ANGELES.
APTIC-26247 07

GOLDSTEIN, BERNARD D.
OZONE AND LIPID PEROXIDATION.
APTIC-24953 07

GOLDSTEIN, ELLIOT
AN EVALUATION OF THE ROLE OF NITROGEN DIOXIDE IN THE DEVELOPMENT OF RESPIRATORY DISEASES IN MAN.
APTIC-25987 07

THE EFFECT OF OZONE IN THE ANTI-BACTERIAL DEFENSE MECHANISMS OF THE MURINE LUNG.
APTIC-26249 07

GOLLMAR, HERBERT A.
REMOVAL OF SULFUR COMPOUNDS FROM COAL GAS.
APTIC-26211 02

GORDON, RICHARD L.
DEVELOPMENT OF A LASER SYSTEM FOR ABSOLUTE ATMOSPHERIC DIFFUSION MEASUREMENT OF A GASEOUS TRACER MATERIAL. (FINAL REPORT).
APTIC-25936 03

GORLACH, E.
PRELIMINARY EVALUATION OF CEMENT DUST FROM ELECTROFILTERS AS A POTASSIUM FERTILIZER.
APTIC-25609 02

GORODINSKII, S. M.
PROPERTIES OF OZONE AS AN INDUSTRIAL POISON.
APTIC-24741 07

GORYSHIN, V. I.
NEW METHOD OF LIGHT MODULATION FOR DUAL-BEAM PHOTOMETERS AND SPECTROPHOTOMETERS.
APTIC-24897 03

GOWER, DONALD E.
THE NEW YORK STATE CONTINUOUS AIR QUALITY MONITORING SYSTEM.
APTIC-23762 03

GOYKHMAN, L. A.
DEVELOPMENT AND TESTING, WITH STANDARDIZED MIXTURES AND ON A VAPOR GENERATOR, OF AN INSTRUMENT FOR MEASURING SO3 IN COMBUSTION PRODUCTS.
APTIC-24879 03

GRAHAM, I. R.
AN ANALYSIS OF TURBULENCE STATISTICS AT FORT WAYNE, INDIANA.
APTIC-25916 05

GRAHAM, JOHN
OVARIAN CANCER AND ASBESTOS.
APTIC-24942 07

GRAHAM, RUTH
OVARIAN CANCER AND ASBESTOS.
APTIC-24942 07

GRAHAM, WILLIAM R.
A MODEL OF GLOBAL CLIMATE AND ECOLOGY.
APTIC-25947 05

GRALA, MARIAN
THE DERIVATION OF GALLIUM AND ALUMINUM FROM COAL AND GAS DUSTS AND ASHES.
APTIC-25744 02

GRAY, EDWARD LEE.
TOXICITY OF NO2 VAPORS AT VERY LOW LEVELS. A PRELIMINARY REPORT.
APTIC-24588 07

GRAY, ROBERT M.
DIFFERENTIAL RESPONSES TO AIR POLLUTION AS AN ENVIRONMENTAL HEALTH PROBLEM.
APTIC-26303 13

GREENBURG, LEONARD
AIR POLLUTION CONTROL HEALTH ASPECTS AND MICROTECHNIQUES.
APTIC-24603 03

INTERMITTENT AIR POLLUTION EPISODE IN NEW YORK CITY, 1962.
APTIC-25829 07

AREA METEOROLOGY.
APTIC-25855 05

GREENWOOD, DELBERT A.
THE EFFECT OF FLUORINE ON DAIRY CATTLE. V. FLUORINE IN THE URINE AS AN ESTIMATOR OF FLUORINE INTAKE.
APTIC-25735 08

GREEN, R.
SAFETY IN AIR SEPARATION PLANTS DETERMINATION OF ATMOSPHERIC POLLUTANTS BY GAS CHROMATOGRAPHY.
APTIC-24592 03

GREVE, L. H.
INFLUENCE OF DUST EXPOSURE UPON THE DISTRIBUTION OF ALVEOLAR VENTILATION.
APTIC-25627 07

GREY, DONALD C.
STABLE ISOTOPES APPLIED TO POLLUTION STUDIES.
APTIC-26123 03

GRIGORESCU, I.
SPECTROCOLORIMETRIC DETERMINATION OF HEXACHLOROCYCLOHEXANE IN THE ATMOSPHERE.
APTIC-24975 03

GRIGORYAN, G. O.
SIMULTANEOUS RECOVERY OF LOW-CONCENTRATION SULFUR OXIDES AND NITROGEN OXIDES WITH ALKALIES AND CARBONATES. IV. ABSORPTION WITH MAGNESIUM HYDROXIDE.
APTIC-24704 06

GRIGORYAN, N. B.
SIMULTANEOUS RECOVERY OF LOW-CONCENTRATION SULFUR OXIDES AND NITROGEN OXIDES WITH ALKALIES AND CARBONATES. IV. ABSORPTION WITH MAGNESIUM HYDROXIDE.
APTIC-24704 06

GRIN, HUGO
PRODUCTION OF SULFUR TRIOXIDE AND SULFURIC ACID.
APTIC-24620 02

GRISCHCHUK, L. P.
SIMULTANEOUS PHYSICAL SINGULARITY IN SPACE FILLED BY DUST-LIKE MEDIUM.
APTIC-25749 06

GROSS, EDWARD
THE NATIONAL AIR POLLUTION POTENTIAL FORECAST PROGRAM.
APTIC-23790 05

GRUT, AAGE
THRESHOLD LIMIT VALUES FOR CARBON MONOXIDE.
APTIC-26103 11

GRYAZEV, A. P.
FINE FILTRATION OF PROCESS AND WASTE GASES FROM LEAD PRODUCTION WITH THE AID OF JET BLAST BAG FILTERS.
APTIC-24771 02

GRYVNAK, DAVID A.
INVESTIGATION OF THE ABSORPTION OF INFRARED RADIATION BY ATMOSPHERIC GASES.
APTIC-25853 06

GUATELLI, MANUEL A.
ATMOSPHERIC POLLUTANTS RESULTS TO DATE OF STUDIES CONDUCTED IN THE CITY OF BUENOS AIRES.
APTIC-26311 04

GUENTHER, A. H.
CHANGES IN ROTATIONAL CONSTANTS IN SOME PI-SIGMA BANDS OF HCN AND N2O.
APTIC-25673 06

GUENTHER, R.
STABILIZATION OF TURBULENT DIFFUSION FLAMES.
APTIC-24698 06

GUEST, E. T.
RECENT DEVELOPMENTS IN BLACK LIQUOR OXIDATION.
APTIC-26173 02

GUNN, ROSS
AN EXPERIMENTAL INVESTIGATION OF THE EFFECT OF AIR POLLUTION ON THE INITIATION OF RAIN.
APTIC-25639 05

GUNTERMANN, WILHELM
A PROCESS FOR THE REMOVAL OF SULFUR COMPOUNDS FROM HOT CRACKING GAS.
APTIC-24749 02

GUSEINOVA, Z. D.
DISTRIBUTION OF CARBON DIOXIDE AND SULFUR CONTAINING IMPURITIES IN THE GAS DISTRIBUTION STREAM.
APTIC-25547 02

GUSEV, M. I.
SCIENTIFIC AND PRACTICAL MEANS OF STUDYING THE JOINT ACTION OF SMALL CONCENTRATIONS OF TOXIC SUBSTANCES IN THE AIR.
APTIC-24692 07

GUSS, SAMUEL B.
CONTAMINATION OF DAIRY FEEDS BY AIR POLLUTION.
APTIC-26276 08

HAAGEN-SMIT, A. J.
INVESTIGATION ON INJURY TO PLANTS FROM AIR POLLUTION IN THE LOS ANGELES AREA.
APTIC-26146 08

HAARER, ERICH
PROCESS FOR THE REMOVAL AND RECLAMATION OF SULFUR DIOXIDE FROM FLUE GASES.
APTIC-26164 02

HAASSER, F.
'REFA' REFRACTORY TILE FOR SMOKESTACKS.
APTIC-25652 06

HABA, A.
DOSING OF SMALL AMOUNTS OF DUST BY MEANS OF A DOSATOR WITH A GRANULAR BASE.
APTIC-25906 08

HAENEL, GOTTFRIED
OBSERVATIONS ON THE THEORY OF JET IMPACTORS.
APTIC-12836 03

HAGEVIK, GEORGE
LEGISLATING FOR AIR QUALITY MANAGEMENT REDUCING THEORY TO PRACTICE.
APTIC-26205 12

HAJDUK, J.
THE STUDY OF DAMAGES CAUSED BY AIR POLLUTION TO LIVE PLANTS AND PLANT COMMUNITIES.
APTIC-25927 08

HALE, DEAN
THE LIQUEFIED NATURAL GAS PLANT OF THE 'WISCONSIN NATURAL' COMPANY AND ITS SPECIAL CHARACTERISTICS.
APTIC-25745 02

HALITSKY, JAMES
TRANSVERSE JET PLUME. (TECHNICAL PROGRESS REPORT).
APTIC-25031 05

HALLADAY, WILLIAM B.
POLLUTION CONTROL A CORPORATE DILEMMA.
APTIC-23612 12

HALLOWS, R. L.
MODERN AUTOMATIC BAGHOUSES FOR COLLECTION OF LEAD-FURNACE FUMES.
APTIC-25781 02

HALL, H. J.
SYSTEMS STUDY OF NITROGEN OXIDE CONTROL METHODS FOR STATIONARY SOURCES.
APTIC-12619 02

FOREIGN PROFILES IN AIR POLLUTION CONTROL ACTIVITIES SPECIAL SOURCES OF INFORMATION.
APTIC-26168 12

HAMAMURA, NORIKATSU
ON THE AIR POLLUTION BY RED OCHRE FACTORIES IN MITSU-CHO. OKAYAMA PREFECTURE, JAPAN.
APTIC-26029 04

STUDIES ON AIR POLLUTION OF NEW DEVELOPING INDUSTRIAL CITY MIZUSHIMA, OKAYAMA PREFECTURE.
APTIC-26043 04

ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE (I).
APTIC-26045 04

ON THE TYPE OF AIR POLLUTION OF MIZUSHIMA, OKAYAMA PREFECTURE.
APTIC-26282 04

ON AIR POLLUTION OF MITSUISHI-TOWN, BIZEN-TOWN AND TAMANO-CITY, OKAYAMA PREFECTURE.
APTIC-26288 04

ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE. (II).
APTIC-26302 04

HAMILTON, R. J.
THE PRODUCTION OF TRANSPARENT PROFILES OF DUST PARTICLES AS AN AID TO AUTOMATIZED PARTICLE COUNTING.
APTIC-26183 03

HAMMER, D. I.
HAIR TRACE METAL LEVELS AND ENVIRONMENTAL EXPOSURE.
APTIC-24716 07

HAMMING, WALTER J.
DETERMINATION OF SMALL AMOUNTS OF SULFURIC ACID IN THE ATMOSPHERE.
APTIC-24874 04

HAMPL, V.
PREPARATION OF RADIOACTIVELY LABELLED CONDENSATION AEROSOLS. I. AEROSOLS OF SODIUM CHLORIDE, SILVER IODIDE AND SULPHURIC ACID.
APTIC-25801 06

HANDA, KAZUKO
THE STATISTICAL SURVEY ON UPPER RESPIRATORY REGION OF SCHOOLCHILDREN IN THE AIR POLLUTION AREA IN WAKAYAMA.
APTIC-26114 07

HANGEBRAUCK, ROBERT P.
POLLUTION FROM COMBUSTION OF FOSSIL FUELS.
APTIC-24732 01

HANSON, GEORGE P.
A PARTIAL POLLUTION SOLUTION PLANT TREES.
APTIC-24622 02

MAN AND AIR -- THREATS TO PRAIRIE SURVIVAL.
APTIC-26055 08

HARADA, G.
TREATMENT OF DUST GENERATED AT IRON MILL.
APTIC-26003 02

HARADA, M.
SYMPOSIUM RECENT PROBLEMS ON AUTOMOTIVE FUELS.
APTIC-26134 02

HARDIN, L. J.
MEASUREMENT OF ATMOSPHERIC FLUORINE. ANALYSES OF RAIN WATERS AND SPANISH MOSS EXPOSURES.
APTIC-24717 04

HARIMA, MIKIO
DESULFURISATION PROCESS IN WHOLE INDUSTRIES. PART I.
APTIC-25882 02

DESULFURIZATION PROCESS IN WHOLE INDUSTRIES (II).
APTIC-26128 02

HARNER, EVELYN B.
ECOLOGICAL STATISTICAL STUDIES CONCERNING ENVIRONMENTAL POLLUTION AND CHRONIC DISEASE.
APTIC-25873 07

HARRINGTON, J. S.
STUDIES OF THE MODE OF ACTION OF ASBESTOS AS A CARCINOGEN.
APTIC-24925 07

HARRIS JR, FRANKLIN S.
THE PHYSICS OF LIGHT SCATTERING.
APTIC-24680 05

HARRIS, LORIN E.
THE EFFECT OF FLUORINE ON DAIRY CATTLE. V. FLUORINE IN THE URINE AS AN ESTIMATOR OF FLUORINE INTAKE.
APTIC-25735 08

HARROLD, G. C.
A PRACTICAL METHOD FOR THE RAPID DETERMINATION OF LEAD WHEN FOUND IN THE ATMOSPHERE.
APTIC-25932 03

HARTKAMP, H.
NITROGEN DIOXIDE IMMISSIONS IN SOME SELECTED DISTRICTS OF THE STATE OF NORDRHEIN-WESTFALEN.
APTIC-24807 04

HARTOGENSIS, F.
ORGANISATION OR DEVELOPMENT OF EUROPEAN COOPERATION IN RESEARCH, STANDARDISATION, AND DOCUMENTATION CONCERNING THE CAMPAIGN AGAINST AIR POLLUTION.
APTIC-25628 14

TERMINOLOGY AND UNITS OF MEASURE.
APTIC-25629 14

HART, GARY E.
CYTOGENIC EFFECTS OF FLUORIDE   TECHNICAL PROGRESS REPORT.
APTIC-25618 08

HASEGAWA, T.
QUANTITATIVE DETERMINATION OF METALLIC AIR POLLUTANTS BY EMISSION SPECTROSCOPIC ANALYSIS.
APTIC-26009 03

HASEK, MILAN
THE DIFFUSION OF SMOKE GASES FROM FACTORY CHIMNEYS AND ITS METEOROLOGICAL CONDITIONS.
APTIC-26267 05

HASENCLEVER, DIETER
A METHOD FOR TESTING HIGH EFFICIENCY MECHANICAL FILTERS FOR THE SEPARATION OF RADIOACTIVE AEROSOLS AND FOR PERSONAL PROTECTION.
APTIC-24967 02

HASHIMOTO, I.
THE EFFECT OF PROLONGED EXPOSURE TO CARBON MONOXIDE ON HUMAN HEALTH.
APTIC-25810 07

HASHIMOTO, TADAYUKI
ENGINE EXHAUST GAS PURIFICATION DEVICE.
APTIC-24822 02

HASSELBLAD, VICTOR
REGRESSION USING 'HOCKEY STICK' FUNCTION.
APTIC-25625 07

HATEM, SIMONE
COMPLEX FORMATION OF IMIDAZOLE AND PYRROLE IN AQUEOUS PHASE AND PREFERENTIAL FIXATION OF 3,4-BENZOPYRENE BY THE MEDIUM.
APTIC-25746 06

HAUSER, THOMAS R.
POLYNUCLEAR AROMATIC HYDROCARBON COMPOSITION OF THE ATMOSPHERE IN SOME LARGE AMERICAN CITIES.
APTIC-25693 04

HAUT, H. VAN
EXPERIMENTAL STUDY OF THE EFFECT OF NITROGEN DIOXIDE ON PLANTS.
APTIC-24808 08

HAWKSLEY, P. G. W.
THE DESIGN AND CONSTRUCTION OF A PHOTOELECTRONIC SCANNING MACHINE FOR SIZING MICROSCOPIC PARTICLES.
APTIC-25943 03

THEORY OF PARTICLE SIZING AND COUNTING BY TRACK SCANNING.
APTIC-26097 03

HAYASHI, H.
STUDIES ON THE REMOVAL OF SULFUR DIOXIDE FROM HOT FLUE GASES AS A MEASURE TO PREVENT AIR POLLUTION   IV. RECOVERY OF FLUE GAS SULFUR AS AMMONIUM PHOSPHATE.
APTIC-24844 02

HAYWARD, BARBARA J.
SATURATED HYDROCARBONS IN SKIN SURFACE LIPIDS.
APTIC-26221 07

HAYWOOD, L. JULIAN
CARBON MONOXIDE LEVELS IN ACUTE MYOCARDIAL INFARCTION.
APTIC-25578 07

HAZELWOOD, R. L.
FATTY ACID ANALYSIS OF CEREBROSPINAL FLUID OF CHICKEN.
APTIC-12616 06

HEDRICK, DELORES
TOXICITY OF OZONE. II. EFFECT OF OXYGEN AND CARBON DIOXIDE UPON ACUTE TOXICITY.
APTIC-26188 07

HEILINGOETTER, R.
ANALYTICAL METHODS USED TO DETERMINE DAMAGE BY ACIDS IN THE ATMOSPHERE.
APTIC-24970 03

HEINEN, C. M.
THE AIR POLLUTION RESEARCH PROGRAM OF THE COORDINATING RESEARCH COUNCIL.
APTIC-25965 12

HEINZE, WERNER
A SCATTERED LIGHT PARTICLE-SIZE SPECTROMETER FOR SUBMICROSCOPIC AEROSOLS OF HIGH CONCENTRATION.
APTIC-25871 03

HEITMANN, HANS-GUNTER
APPARATUS FOR CONTINUOUSLY MEASURING THE CONCENTRATION OF A GAS-MIXTURE COMPONENT.
APTIC-25637 03

HELLSTROM, BENGT
THE SCA-BILLERUD RECOVERY PROCESS.
APTIC-26171 02

HELMS, GRADY T.
CHATTANOOGA, TENNESSEE -- ROSSVILLE, GEORGIA INTERSTATE AIR QUALITY STUDY 1967-1968.
APTIC-26086 04

HENDERSON, MAUREEN
CARBON MONOXIDE IN TOWN AIR   AN INTERIM REPORT.
APTIC-25799 04

HENDERSON, WAYNE L.
CATALYTIC OXIDATION UNIT FOR DOMESTIC OVEN EXHAUST.
APTIC-25554 02

HENDRICKS JR, CHARLES D.
CONDUCTION AND PUMPING IN DIELECTRIC LIQUIDS UNDER THE INFLUENCE OF AN APPLIED ELECTRIC FIELD.
APTIC-25684 06

HENDRICKS, R. H.
HAIR TRACE METAL LEVELS AND ENVIRONMENTAL EXPOSURE.
APTIC-24716 07

HENKE, WILLIAM G.
THE NEW 'HOT' ELECTROSTATIC PRECIPITATOR.
APTIC-24675 02

HENTSCHEL, D.
DUST FALL IN THE VICINITY OF CEMENT FACTORIES AS IT RELATES TO POSSIBLE HEALTH HAZARDS PART 2.
APTIC-24708 07

HERBERT, P.-Y.
RESULTS OF FIVE YEARS EXPERIENCE WITH THE BEHAVIOR OF INSULATORS FOR MEDIUM VOLTAGE UNDER CONDITIONS OF NATURAL INDUSTRIAL POLLUTION.
APTIC-26241 09

HEREDY, LASZLO A.
ELECTROCHEMICAL PROCESS FOR RECOVERING SULFUR VALUES.
APTIC-25913 02

HERMANCE, H. W.
COMBATTING THE EFFECTS OF SMOG ON WIRE-SPRING RELAYS.
APTIC-25606 09

HERMAN, MARC VICTOR EDGARD
ELECTROSTATIC SEPARATOR.
APTIC-25864 02

HERRMANN, ERICH
TREATMENT OF WASTE AIR AND GASES IN THE PROCESS INDUSTRIES.
APTIC-24755 02

HERRMANN, ROBERT H.
CLOSED-TOP CUPOLAS END AIR CONTAMINATION.
APTIC-26184 02

HESS, WALTER
REPORT ON THE STATE OF AIR POLLUTION IN SWITZERLAND.
APTIC-26135 12

HESS, W.
THE TECHNIQUES OF MEASUREMENT IN THE OIL HEATING CONTROL OF THE CITY OF ZURICH AND THE WAY OF ITS APPLICATION.
APTIC-26137 03

HESTER, WINNIFRED
MEASUREMENT OF ATMOSPHERIC FLUORINE. ANALYSES OF RAIN WATERS AND SPANISH MOSS EXPOSURES.
APTIC-24717 04

HEUSER, STANLEY G.
VOLUMETRIC DETERMINATION OF CONCENTRATIONS OF SULFURYL FLUORIDE IN AIR.
APTIC-26203 03

HICKEY, JOHN L. S.
THE AIR OF ANCHORAGE--TODAY AND TOMORROW.
APTIC-25770 04

HICKEY, RICHARD J.
ECOLOGICAL STATISTICAL STUDIES CONCERNING ENVIRONMENTAL POLLUTION AND CHRONIC DISEASE.
APTIC-25873 07

HIDY, G. M.
COLLISION-RATE THEORY AND THE COAGULATION OF FREE-MOLECULE AEROSOLS.
APTIC-25984 05

HIGASHI, MASAO
A NEW DRY PROCESS OF SO2 REMOVAL FROM FLUE GAS.
APTIC-24589 02

HIMI, Y.
STUDIES ON REGIONAL REPRESENTATIVE VALUE OF AIR POLLUTANT.
APTIC-26131 04

HINDAWI, IBRAHIM J.
CHATTANOOGA, TENNESSEE -- ROSSVILLE, GEORGIA INTERSTATE AIR QUALITY STUDY 1967-1968.
APTIC-26086 04

HINES, J. MICHAEL
AUTOMOTIVE POLLUTION CONTROL.
APTIC-23390 12

HINE, C. H.
EYE IRRITATION FROM AIR POLLUTION.
APTIC-24710 07

A STUDY OF THE EFFECTS OF AIR POLLUTANTS ON THE EYE.
APTIC-25756 07

HINO, MIKIO
DIFFUSION OF SMOKE FROM A HIGH STACK.
APTIC-26141 05

HIRAKAWA, HIROSHI
OZONE CRACKING OF RUBBERS.
APTIC-24799 09

HIRATA, J.
REGENERATION METHOD OF GAS DESULFURIZATION LIQUOR.
APTIC-26046 02

HIRATA, Y.
CONTINUOUS MEASUREMENT OF LOW GRADE HYDROCARBONS IN URBAN ATMOSPHERE.
APTIC-26109 03

HIROSE, ROKURO
CRUDE OIL FUELS TWO 375-MW UNITS IN JAPAN.
APTIC-25690 01

HIRSCHFELD, T.
REMOTE RAMAN SPECTROSCOPY AS A POLLUTION RADAR.
APTIC-24637 03

HITCHCOCK, MARGARET
HEALTH EFFECTS OF PHOTOCHEMICAL OXIDANTS.
APTIC-26223 07

HITOMI, OSAM
METHOD OF ELIMINATING SULFUR DIOXIDE AND HYDROGEN SULFIDE FROM EXHAUST GAS.
APTIC-24046 02

HLUCHAN, E.
THE EFFECT OF FLUORINE EXHALATION ON ANIMALS IN THE SURROUNDINGS OF AN ALUMINUM PLANT.
APTIC-25665 08

HOCHHEISER, SEYMOUR
CONTINUOUS SAMPLING AND ULTRAMICRODETERMINATION OF NITROGEN DIOXIDE IN AIR.
APTIC-24900 03

HODGESON, J. A.
CHEMILUMINESCENT MEASUREMENT OF ATMOSPHERIC OZONE   RESPONSE CHARACTERISTICS AND OPERATING VARIABLES.
APTIC-25653 03

HODGE, HAROLD C.
THE EFFECTS OF THE ABSORPTION OF FLUORIDE. V. THE CHEMICAL DETERMINATION OF FLUORIDE IN HUMAN SOFT TISSUES FOLLOWING PROLONGED INGESTION OF FLUORIDE AT VARIOUS LEVELS.
APTIC-25946 07

HOEGGER, DIETER
THE LEGAL BASIS OF AIR POLLUTION CONTROL.
APTIC-25555 12

HOFFMANN, K.
THE FORMATION OF CARBON DISULFIDE RESULTING FROM THE REACTION BETWEEN SULFUR DIOXIDE AND COAL.
APTIC-26155 02

HOFFMAN, K. C.
METAL HYDRIDES AS A SOURCE OF FUEL FOR VEHICULAR PROPULSION.
APTIC-24746 02

HOFREUTER, D. H.
THE PUBLIC HEALTH SIGNIFICANCE OF ATMOSPHERIC LEAD.
APTIC-25991 07

HOGAN, AUSTIN W.
ICE NUCLEI FROM DIRECT REACTION OF IODINE VAPOR WITH VAPORS FROM LEADED GASOLINE.
APTIC-26191 01

HOGAN, M. J.
EYE IRRITATION FROM AIR POLLUTION.
APTIC-24710 07

HOGA, YOSHIAKI
REPORT ON AIR POLLUTION STUDY (NO. 4).
APTIC-26027 04

HOLDEN, FRANCIS R.
AN INVENTORY OF AUTOMOBILE GASES.
APTIC-24700 01

HOLDEN, F. R.
A PRACTICAL METHOD FOR THE RAPID DETERMINATION OF LEAD WHEN FOUND IN THE ATMOSPHERE.
APTIC-25932 03

HOLLAND, ROBERT A. B.
CELL AND SOLUTION VELOCITY CONSTANTS FOR THE REACTION CO & HB YIELDS COHB AT DIFFERENT TEMPERATURES IN MAMMALS WITH DIFFERENT RED CELL SIZES.
APTIC-25835 07

HOLOBRADY, K.
THE PROBLEM OF CEMENT FACTORY DUST FROM THE AGRICULTURAL STANDPOINT.
APTIC-25964 08

HOLZWORTH, GEORGE C.
ENVIRONMENTAL SIMULATION IN AIR POLLUTION CONTROL.
APTIC-25762 05

HONMA, MASAO
DIFFUSION OF SMOKE FROM A HIGH STACK.
APTIC-26141 05

HONDA, S.
THE EFFECT OF PROLONGED EXPOSURE TO CARBON MONOXIDE ON HUMAN HEALTH.
APTIC-25810 07

HONMA, TOMIZO
TOSHIBA ELECTROSTATIC AIR FILTER.
APTIC-26296 02

HONOLD, EDITH
APPLICATION OF MERCURY-INTRUSION METHOD FOR DETERMINATION OF PORE-SIZE DISTRIBUTION TO MEMBRANE FILTERS.
APTIC-24856 02

HOORY, S. E.
ADSORPTION OF HYDROCARBONS ON GRAPHITIZED CARBON.
APTIC-25621 02

HOPPEL, WILLIAM ALBERT
THE IONS OF THE TROPOSPHERE   THEIR INTERACTIONS WITH AEROSOLS AND THE GEOELECTRIC FIELD.
APTIC-26080 05

HORIUCHI, KAZUYA
LEAD IN THE ENVIRONMENT AND ITS EFFECT ON MAN IN JAPAN.
APTIC-26260 07

HORI, MASAHIRO
HORIZONTAL AND VERTICAL DISTRIBUTION OF LEAD PARTICULATES IN AIR AROUND A BUSY ROAD IN YOKOHAMA CITY.
APTIC-25881 04

HORTON, ROBERT J. M.
HEALTH EFFECTS RESEARCH PROGRAM OF THE NATIONAL AIR POLLUTION CONTROL ADMINISTRATION.
APTIC-26213 12

HORTON, R. J. M.
HAIR TRACE METAL LEVELS AND ENVIRONMENTAL EXPOSURE.
APTIC-24716 07

HOSHIKA, Y.
QUALITATIVE ANALYSES OF ODOR COMPONENTS IN THE PYROLYSIS OF FEATHER IN THE LABORATORY TEST.
APTIC-26014 02

HOSHINO, KIYOSHI
QUANTITATIVE ANALYZER OF SULFUR CONTENTS.
APTIC-25911 03

HOSHIZAWA, KINJI
FORMATION AND THEIR PREVENTION OF ACID SMUTS AT OIL FIRED BOILER.
APTIC-24817 02

HOSHO, YUKIO
THE EXHAUST EMISSION CONTROL SYSTEM FOR ROTARY ENGINES.
APTIC-26008 02

HOTCHKISS JR, HENRY T.
RECOVERY OF SULPHUR.
APTIC-24576 02

HOUSE, CHARLES
LET'S GANG UP ON POLLUTION.

APTIC-25729 03

HOUSE, WILLIAM T.
HYDRODESULFURIZATION OF HEAVY PETROLEUM DISTILLATES.
APTIC-25713 02

HOVEY, M. W.
PROCESSES FOR RECOVERING SULFUR FROM SECONDARY SOURCE MATERIALS.
APTIC-22809 02

HOWARD, GUY CLEMENS
IMPROVED METHOD OF MAKING SULPHUR FROM SULPHUR DIOXIDE.
APTIC-26197 02

HOWES, P.
A PROCEDURE FOR THE SPECIFICATION OF DISTRIBUTOR PUMPS FOR HIGH VOLUME PRODUCTION.
APTIC-25923 02

HSUEH, LININ
POWER AND INDUSTRY CONTROL OF NITROGEN OXIDE EMISSIONS.
APTIC-26226 02

POWER AND INDUSTRY CONTROL OF SULFUR DIOXIDE EMISSIONS.
APTIC-26230 02

POWER AND INDUSTRY HYDROCARBONS AND OTHER ORGANIC SPECIES.
APTIC-26231 02

POWER AND INDUSTRY CONTROL OF CARBON MONOXIDE EMISSIONS.
APTIC-26232 02

POWER AND INDUSTRY PARTICULATES.
APTIC-26233 02

MISCELLANEOUS INDUSTRIAL EMISSIONS.
APTIC-26254 01

HUEBNER, ROLF
IMPROVEMENTS RELATING TO METHODS OF AND INSTRUMENTS FOR MEASURING THE CONCENTRATION OF COMBUSTIBLE GAS IN AN AIR SAMPLE.
APTIC-26245 03

HUEPER, W. C.
CARCINOGENS IN THE HUMAN ENVIRONMENT. (PART I).
APTIC-25681 07

RECENT DEVELOPMENTS IN ENVIRONMENTAL CANCER.
APTIC-26144 07

HUETER, F. GORDON
HEALTH EFFECTS RESEARCH PROGRAM OF THE NATIONAL AIR POLLUTION CONTROL ADMINISTRATION.
APTIC-26213 12

HUETER, F. G.
CONSIDERATIONS IN DEVELOPING AIR QUALITY CRITERIA.
APTIC-25575 11

HULL, HERBERT
INVESTIGATION ON INJURY TO PLANTS FROM AIR POLLUTION IN THE LOS ANGELES AREA.
APTIC-26146 08

HULS, THOMAS A.
DISCUSSION OF 'A STATISTICAL APPROACH TO DESCRIBING VEHICULAR DRIVING CYCLES'. F. BECKLEY SMITH, JR., W. A. P. MEYER, AND R. U. AYRES, SAE PAPER NO. 690212.
APTIC-12771 06

HUNN, R. W.
MEASURING GASEOUS EMISSIONS FROM AN AIRCRAFT TURBINE ENGINE.
APTIC-24745 03

HUSTON, J. L.
PREPARATION OF RADIOACTIVE SULFUR DIOXIDE FROM BARIUM SULFATE.
APTIC-25929 06

HUTCHISON, DALE H.
AN INVENTORY OF AUTOMOBILE GASES.
APTIC-24700 01

HYKES, RUTH
CARCINOGENIC HYDROCARBONS AND RELATED COMPOUNDS IN PROCESSED RUBBER.
APTIC-24629 01

APTIC-24629 01

ICHIJO, M.
TECHNOLOGY OF POLLUTION-CONTROL IN ZINC AND LEAD SMELTING.
APTIC-26107 01

ICHIKAWA, H.
MANUFACTURING METHOD OF ACTIVATED CHARCOAL.
APTIC-24672 02

ICHIKAWA, SHOGO
STUDIES ON AIR POLLUTION OF NEW DEVELOPING INDUSTRIAL CITY MIZUSHIMA, OKAYAMA PREFECTURE.
APTIC-26043 04

ON AIR POLLUTION OF MITSUISHI-TOWN, BIZEN-TOWN AND TAMANO-CITY, OKAYAMA PREFECTURE.
APTIC-26288 04

ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE. (II).
APTIC-26302 04

IHARA, TAKASHI
QUANTITATIVE ANALYZER OF SULFUR CONTENTS.
APTIC-25911 03

IIDA, HIROBUMI
DEVELOPMENT OF HIGH SPEED BURNER.
APTIC-24824 02

IINOYA, KOICHI
EXPERIMENTS ON ANISOKINETIC SAMPLING ERRORS FOR SOLID-LIQUID TWO-PHASE FLOW.
APTIC-25574 03

SEPARATION MECHANISM OF ROUND NOZZLE CASCADE IMPACTOR EFFECT OF CLEARANCE RATIO.
APTIC-25719 03

IKEDA, TAIRA
STUDIES ON PUBLIC NUISANCE CAUSED BY AIR POLLUTION. 2. AIR POLLUTION IN TAJIMI CITY.
APTIC-26209 04

IKEDA, TERUTIKA
EXPERIMENTAL CARBON MONOXIDE POISONING ITS ELECTROPHYSIOLOGICAL EFFECTS ON THE VISUAL PATHWAY IN CATS.
APTIC-25836 07

IMAI, MASAYUKI
SOME OBSERVATIONS ON ANIMALS EXPOSED TO AIR POLLUTANTS ESPECIALLY SULPHUR OXIDES.
APTIC-26116 07

PRESENT STATE OF AIR POLLUTION IN YOKKAICHI AND VARIOUS MEDICAL PROBLEMS ABOUT IT.
APTIC-26305 07

INGLETT, G. E.
DETECTION OF POLLEN FLAVONOIDS BY FLUORESCENCE ON IMPREGNATED PAPERS.
APTIC-25928 03

INNES, WILLIAM B.
GAS TESTING PROCESS FOR SMOG FORMING CONSTITUTENTS.
APTIC-25734 03

INN, EDWARD C. Y.
OZONE ABSORPTION COEFFICIENTS IN THE VISIBLE AND ULTRAVIOLET REGIONS.
APTIC-24701 06

INOGUCHI, MASAO
ON HYDROCRACKING DESULFURIZATION CATALYST FOR RESIDUAL OIL.
APTIC-26132 02

INOUE, KATSUYA
REACTIVITY OF FERRIC OXYHYDROXIDE TO SULFUR DIOXIDE.
APTIC-26126 02

INOUE, KEIICHI
THE DISTRIBUTION OF CARBON, VANADIUM AND NICKEL DEPOSITS ON CATALYST LAYER DURING HYDRODESULFURIZATION PROCESSES OF PETROLEUM RESIDUM.
APTIC-26129 02

INOUE, MASATOSHI
VENTILATION OF POLLUTED AIR IN ROOMS. VIII. STUDIES ON THEORETICAL EQUATIONS FOR VENTILATION OF POLLUTED AIR DIFFUSED HETEROGENEOUSLY IN ROOM.
APTIC-24647 06

INOUE, T.
THE EFFECT OF PROLONGED EXPOSURE TO CARBON MONOXIDE ON HUMAN HEALTH.
APTIC-25810 07

IRELAND, F. E.
CONTROL OF SPECIAL INDUSTRIAL EMISSIONS IN BRITAIN.
APTIC-25879 12

IRSLINGER, OTTO
PRESSURE DIFFERENTIAL SWITCHES OR REGULATORS FOR THE OPENING AND CLOSING OF ELECTRICAL CONTACTS.
APTIC-24595 06

ISAHAYA, H.
GAS FILTER.
APTIC-26022 02

ISHIDA, BUNTA
A STATISTICAL STUDY ON CHRONIC RESPIRATORY DISEASE AMONG STUDENTS OF JUNIOR HIGH SCHOOL IN ODAWARA CITY.
APTIC-26283 07

ISHIDA, HISAYUKI
PREVALENCE OF RESPIRATORY SYMPTOMS AND PEAK FLOW RATE OF THREE YEAR OLD CHILDREN.
APTIC-26089 07

ISHIDA, KENGO
ELECTRODYNAMIC BEHAVIOR OF CHARGED AEROSOL PARTICLES IN AN INHOMOGENEOUS ALTERNATING FIELD AND POSSIBILITIES OF ITS APPLICATION IN DUST ENGINEERING.
APTIC-26041 06

ISHVGURO, TATSUKICHI
ODOR CONTROL IN FISH AND BONE MEAL FACTORIES IN NORTH EUROPE. (III). (DE LAVAL SYSTEM AND ATV SYSTEM).
APTIC-26002 02

ISHIGURO, T.

QUALITATIVE ANALYSES OF ODOR COMPONENTS IN THE PYROLYSIS OF
FEATHER IN THE LABORATORY TEST.
APTIC-26014 02

ISHII, TAKESHI
ALTERNATING CURRENT POLAROGRAPHIC ANALYSIS OF LEAD IN
AUTOMOBILE EXHAUST GAS.
APTIC-24617 03

RAPID ANALYSIS OF LEAD IN AUTOMOBILE EXHAUST GAS.
APTIC-24618 03

APTIC-24618 03

ISHIKAWA, TATSUO
REACTIVITY OF FERRIC OXYHYDROXIDE TO SULFUR DIOXIDE.
APTIC-26126 02

ISHIKAWA, YOSHINORI
AN ANALYSIS OF THE DRIVING PATTERN IN THE METROPOLITAN AREA.
PART II.
APTIC-25725 01

AN ANALYSIS OF THE DRIVING PATTERN IN METROPOLITAN AREA.
PART I.
APTIC-25726 01

A TENTATIVE PLAN CONCERNING A COMPREHENSIVE ASSESSMENT OF
ENVIRONMENTAL POLLUTION.
APTIC-26304 04

ISHINISHI, NOBURU
ON RELATIONSHIP OF CHRONIC RESPIRATORY DISEASES TO AIR
POLLUTION.
APTIC-26032 07

ISHINISHI, SHIN
RELATIONSHIP BETWEEN AIR POLLUTION AND ASTHMATIC DISEASES
AMONG PRIMARY SCHOOL CHILDREN IN KITA-KYUSHU. PART I.
STATISTICAL ANALYSIS BASED ON QUESTIONNAIRES.
APTIC-25739 07

ISHINO, T.
ELIMINATION OF POLLUTION CAUSED BY FOUNDRY WORKS.
APTIC-26058 02

ISLER, R. C.
MEASUREMENT OF THE LIFETIME OF THE A 1 PI STATE OF CO BY
LEVEL-CROSSING SPECTROSCOPY.
APTIC-24888 06

ISSENMANN, EDWARD S.
MOBILE DUST AND DEBRIS COLLECTION AND INERTIAL DUST
SEPARATOR FOR AIRPORT RUNWAYS AND/OR STREET CLEANING.
APTIC-25709 02

ITO, SHOJI
MAINTENANCE AND MANAGEMENT OF AIR-CLEANING DEVICES IN
FACTORIES.
APTIC-25889 02

IVANOV, V. N.
INVESTIGATION OF ATMOSPHERIC TURBULENCE BY MEANS OF THE M-27
BRIDLED-CUP ANEMOMETER.
APTIC-25978 05

IVIE, JAMES O.
WIND DIRECTION, VELOCITY AND TURBULENCE INSTRUMENTATION FOR
AIR POLLUTION DIAGNOSIS.
APTIC-24862 03

IXFELD, H.
AN ARTICLE DEALING WITH SULFUR DIOXIDE EMISSIONS AND THEIR
EFFECTS ON VEGETATION.
APTIC-26174 04

JACOBI, W.
THE ADDITION OF NATURAL RADIONUCLIDES TO AEROSOL PARTICLES
AND PRECIPITATION ELEMENTS IN THE ATMOSPHERE.
APTIC-24976 05

PARTICLE-SIZE SPECTROMETRY OF AEROSOLS BY LIGHT SCATTERING
IN A LASER BEAM AND ITS APPLICATION TO AIR MONITORING AND
FILTER TESTING.
APTIC-26214 03

JACOBSON, L. D.
A REVIEW AND COMPARISON OF SELECTED UNITED STATES ENERGY
FORECASTS.
APTIC-26085 01

JACOBS, MORRIS B.
AIR POLLUTION CONTROL HEALTH ASPECTS AND MICROTECHNIQUES.
APTIC-24603 03

CONTINUOUS SAMPLING AND ULTRAMICRODETERMINATION OF NITROGEN
DIOXIDE IN AIR.
APTIC-24900 03

JAFFE, SIGMUND
OXIDATION OF ETHYLENE BY THE PHOTOLYSIS OF NO2 AT 25 C.
APTIC-25941 06

JAHNKE, HERBERT
ELECTROSTATIC CONDITIONING ARRANGEMENT.
APTIC-25711 02

JAHN, JORGEN
A NEW SEDIMENTATION METHOD FOR DUST SPECIMENS.
APTIC-25869 03

JAMES, R. H.
AEROSOL PREPARATION, GENERATION, AND ASSESSMENT. PROJECT
MAZE.
APTIC-25760 03

JANDER, KLAUS
AN ABSORPTION APPARATUS FOR GAS ANALYSIS.
APTIC-24651 03

JANIS, M.
A COOPERATIVE STUDY OF CERTAIN MEASUREMENTS OF EMPHYSEMA.
APTIC-24804 07

JANOVICOVA, J.
THE INFLUENCE OF FLUORINE EXHALATION ON THE FLORA IN THE
SURROUNDINGS OF AN ALUMINUM PLANT.
APTIC-25661 08

JAY, M.
STUDY OF THE ATMOSPHERIC POLYCYCLIC HYDROCARBONS. I.
PROBLEMS CONNECTED WITH THE COUPLING OF THIN-LAYER
CHROMATOGRAPHY AND GAS CHROMATOGRAPHY.
APTIC-24705 03

JECKO, G.
ANALYSIS OF BLAST FURNACE GAS BY GAS-SOLID CHROMATOGRAPHY.
APTIC-25654 03

JELLINEK, HANS H. G.
THE EFFECT OF AIR POLLUTANTS ON POLYMERS.
APTIC-25680 09

JELLINEK, H. H. G.
REACTION OF SO2 WITH POLYMER.
APTIC-24742 09

JENKINS, T. F.
FEASIBILITY OF TUNNEL DETECTION BY TRACE GAS ANALYSIS.
APTIC-24577 03

JEQUIER, N.
STUDY OF THE ATMOSPHERIC POLYCYCLIC HYDROCARBONS. I.
PROBLEMS CONNECTED WITH THE COUPLING OF THIN-LAYER
CHROMATOGRAPHY AND GAS CHROMATOGRAPHY.
APTIC-24705 03

JINICH, HORACIO
AIR POLLUTION I. INTRODUCTION.
APTIC-24670 07

JOHNSON JR, CHARLES C.
PREPARED STATEMENT OF CHARLES C JOHNSON, JR., ADMINISTRATOR,
ENVIRONMENTAL HEALTH SERVICE, PUBLIC HEALTH SERVICE,
DEPARTMENT OF HEALTH, EDUCATION AND WELFARE.
APTIC-24857 12

JOHNSON, JOHN L.
AIR HUMIDITY AND BRUSH CONTACT DROP THE EFFECT OF WATER
VAPOR, SULFUR DIOXIDE, AND HYDROGEN SULFIDE.
APTIC-24943 09

JOHNSON, L. R.
ATMOSPHERIC DUSTS COLLECTED OFF THE WEST AFRICAN COAST.
APTIC-26016 04

JOHNSON, ROWLAND E.
PREPARATION OF RADIOACTIVE SULFUR DIOXIDE FROM BARIUM
SULFATE.
APTIC-25929 06

JOHNSON, WARREN B.
A PRACTICAL, MULTIPURPOSE URBAN DIFFUSION MODEL FOR CARBON
MONOXIDE. (FINAL REPORT).
APTIC-25995 05

JOHNSON, WAYNE S.
STATISTICAL REPORT OF AEROALLERGENS (POLLENS AND MOLDS) FORT
HUACHUCA, ARIZONA 1969.
APTIC-25679 04

JOHNSTON, HAROLD
REACTIONS IN THE ATMOSPHERE.
APTIC-26229 05

JOHN, A. D. ST.
STUDY OF ATMOSPHERIC AND AAP OBJECTIVES OF CROSS-BEAM
EXPERIMENTS. (FINAL REPORT).
APTIC-24924 03

JONES, K.
SAFETY IN AIR SEPARATION PLANTS DETERMINATION OF
ATMOSPHERIC POLLUTANTS BY GAS CHROMATOGRAPHY.
APTIC-24592 03

JOOSTING, P. E.
SPIROGRAM AND WASH-OUT CURVE DO THESE METHODS DISCRIMINATE
BETWEEN THE EFFECTS OF DUST INHALATION AND SMOKING UPON LUNG
VENTILATION.
APTIC-25576 07

INFLUENCE OF DUST EXPOSURE UPON THE DISTRIBUTION OF ALVEOLAR
VENTILATION.
APTIC-25627 07

JUDD, STANLEY H.
AIR SAMPLING AND ANALYSIS OF LEAD ON PAPER.
APTIC-25949 03

JUENTGEN, HARALD
DESULFURIZATION OF FLUE GAS WITH ADSORPTION COKE OF VARIABLE
PROPERTIES.

APTIC-24709 02

JUNGE, R.
STUDY OF THE SO2 OXIDATION IN SOLUTION AND ITS ROLE IN ATMOSPHERIC CHEMISTRY.
APTIC-26185 02

JURKOWSKA, H.
PRELIMINARY EVALUATION OF CEMENT DUST FROM ELECTROFILTERS AS A POTASSIUM FERTILIZER.
APTIC-25609 02

JUST, JAN
THE DEATH RATE DUE TO LUNG CANCER IN PEOPLE LIVING IN SELECTED TOWNS IN POLAND IN THE POLLUTION OF THE ATMOSPHERE.
APTIC-24935 07

KABAI, J.
THE EFFECT OF HEAT TREATMENT ON THE STRUCTURE OF KAOLIN AND ITS IN VITRO HEMOLYTIC ACTIVITY.
APTIC-25891 07

KAGASOV, V. M.
EVALUATION OF THE PROCESS OF OBTAINING AROMATIC HYDROCARBONS FROM COKE-OVEN GAS.
APTIC-24620 02

KAGAWA, JUN
PREVALENCE OF RESPIRATORY SYMPTOMS AND PEAK FLOW RATE OF THREE YEAR OLD CHILDREN.
APTIC-26089 07

KAGEYAMA, J.
REQUESTS AND OPINIONS CONCERNING THE ADMINISTRATION OF THE ENVIRONMENTAL STANDARD FOR SULFUR OXIDES.
APTIC-26111 12

KAKEGAWA, YASUO
DEVELOPMENT OF HIGH SPEED BURNER.
APTIC-24024 02

KANEI, SHIRO
THE EFFECT OF CARBON MONOXIDE ON TISSUE RESPIRATION. CHRONIC CARBON MONOXIDE POISONING SERIES VI.
APTIC-25800 07

A DEVICE FOR THE PROLONGED AND REPEATED EXPOSURE OF ANIMALS TO CARBON MONOXIDE. (CHRONIC CARBON MONOXIDE POISONING SERIES II).
APTIC-26236 07

KANEKO, ETSUYA
THE MAINTENANCE AND PRESERVATION OF THE EFFICIENCY OF AN ELECTRIC AIR-CLEANING DEVICE.
APTIC-25724 02

KANAGAWA, AKIRA
DE-ENTRAINMENT IN PLATE COLUMN.
APTIC-25573 02

RESPONSE CALCULATIONS FOR SIDEWAYS LIGHT SCATTERING AEROSOL PARTICLE COUNTERS.
APTIC-25721 03

KANEKO, FUSA
FINDINGS OF PFR ON SO2 HIGH SENSITIVE SCHOOL CHILDREN.
APTIC-25740 07

KANEKO, YOSHINOBO
HOSPITAL INFECTION.
APTIC-25890 01

KAPLIN, EDWARD J.
TRANSVERSE JET PLUME. (TECHNICAL PROGRESS REPORT).
APTIC-25031 05

KARASEV, A. G.
INVESTIGATION OF THE PROCESSES OF MASS EXCHANGE AND CHEMOSORPTION IN ROTATION-TYPE EQUIPMENT.
APTIC-24769 02

KAROL, I. L.
THE USE OF RADIOACTIVE TRACERS IN QUANTITATIVE STUDIES OF MOVEMENTS OF THE ATMOSPHERE.
APTIC-25042 05

KASAHARA, NAOKI
MAINTENANCE AND MANAGEMENT OF AIR-CLEANING DEVICES IN OFFICE BUILDINGS.
APTIC-25915 02

KASAHARA, YUKIO
GULF METHOD.
APTIC-26066 02

KASAI, MASATAKA
CORROSION PRODUCTS IN VARIOUS ENVIRONMENTS.
APTIC-25727 09

KASHIWABARA, T.
PRODUCTION AND COST OF LEADLESS GASOLINE.
APTIC-26021 02

KASSNER JR, J. L.
STEADY STATE AND NON-STEADY STATE DIFFUSION THEORY OF DROPLET GROWTH.
APTIC-25634 05

KATAYAMA, H.
SYMPOSIUM RECENT PROBLEMS ON AUTOMOTIVE FUELS.
APTIC-26134 02

KATELL, SIDNEY
HERE'S WHAT SO2 REMOVAL COSTS.
APTIC-22444 10

KATORI, YOKO
RELATIONSHIP BETWEEN AIR POLLUTION AND ASTHMATIC DISEASES AMONG PRIMARY SCHOOL CHILDREN IN KITA-KYUSHU. PART I. STATISTICAL ANALYSIS BASED ON QUESTIONNAIRES.
APTIC-25739 07

KATSUNASA, URUNO
SMOG AND RICKETS.
APTIC-26033 07

RECENT RICKETS IN INFANTS OF TOKYO METROPOLIS.
APTIC-26034 07

KATZ, MORRIS
INSTRUMENTATION AND ANALYTICAL TECHNIQUES FOR THE CONTINUOUS DETERMINATION OF AIR CONTAMINANTS.
APTIC-24927 03

TIME CONSTANT OF A THOMAS AUTOMETER AND SIGNIFICANCE OF INDICATED RESPONSE.
APTIC-25777 03

ANALYSIS OF POLYCYCLIC HYDROCARBONS IN PARTICULATE POLLUTANTS.
APTIC-25920 03

CARCINOGENIC HAZARDS OF AROMATIC POLYCYCLIC HYDROCARBONS IN THE POLLUTED ATMOSPHERE.
APTIC-26206 07

AIR POLLUTION AND ASSOCIATED HEALTH HAZARDS FROM DIESEL LOCOMOTIVE TRAFFIC IN A RAILWAY TUNNEL.
APTIC-26262 01

KAWASHIMA, NATSUKI
CORROSION PRODUCTS IN VARIOUS ENVIRONMENTS.
APTIC-25727 09

KAWAUCHI, Y.
SULFUR OXIDES BY OIL-FIRING.
APTIC-26119 02

KAZARINOFF, ANDREW
INDUSTRIAL AIR POLLUTION--ITS CONTROL AND COST.
APTIC-24881 02

APTIC-24881 02

KEARNEY, JOHN R.
ENEMIES IN THE AIR.
APTIC-24920 02

KEENAN, ROBERT G.
THE ABSOLUTE EFFICIENCY OF THE IMPINGER AND OF THE ELECTROSTATIC PRECIPITATOR IN THE SAMPLING OF AIR CONTAINING METALLIC LEAD FUME.
APTIC-26145 03

KEENAN, R. G.
THE PUBLIC HEALTH SIGNIFICANCE OF ATMOSPHERIC LEAD.
APTIC-25991 07

KEHOE, ROBERT A.
THE METABOLISM OF LEAD IN MAN IN HEALTH AND DISEASE. PART II. THE METABOLISM OF LEAD UNDER ABNORMAL CONDITIONS.
APTIC-24614 07

THE HYGIENIC ASPECTS OF THE PRODUCTION AND USE OF LEAD ANTIKNOCK COMPOUNDS.
APTIC-24876 07

TETRAMETHYLLEAD AS SUBSTITUTE FOR TETRAETHYLLEAD.
APTIC-25944 07

KEITH, JAMES
OXIDATION OF ETHYLENE BY THE PHOTOLYSIS OF NO2 AT 25 C.
APTIC-25941 06

KELLER, TH.
THE CURRENT LEAD CONTENT IN VEGETATION GROWING IN THE VICINITY OF SWISS HIGHWAYS.
APTIC-25070 08

KENNEDY, HAROLD W.
CONTROL OF AUTOMOBILE EMISSIONS- CALIFORNIA EXPERIENCE AND THE FEDERAL LEGISLATION.
APTIC-25591 12

KENNEDY, N. C.
AEROSOL PREPARATION, GENERATION, AND ASSESSMENT. PROJECT HARE.
APTIC-25760 03

KENT, FINLEY
CARBON MONOXIDE LEVELS IN ACUTE MYOCARDIAL INFARCTION.
APTIC-25570 07

KERR, J. ALISTAIR
THE FORMATION AND DECOMPOSITION REACTIONS OF THE ACETYL RADICAL AND THE HEAT OF FORMATION OF THE ACETYL RADICAL.
APTIC-25020 06

KESLER, RICHARD B.
MODERN METHODS OF MONITORING GASEOUS PULP MILL EFFLUENTS FOR SULFUR COMPOUNDS.
APTIC-24939 03

KESSLER, YVES
BRONCHIAL CANCER IN THE IRON MINER OF THE LORRAINE BASIN. (BASED ON 225 OBSERVATIONS).
APTIC-26001 07

KETTNER, H.
OBJECTIONABLE SOOT EMISSIONS.
APTIC-25549 01

DUST AND SOOT NUISANCES AT A METALLURGICAL COKING PLANT AND IN ITS ENVIRONMENT.
APTIC-26040 01

KHALAIMOVA, A. M.
DETERMINING THE COMPOSITION OF RAW BENZENE BY GAS-LIQUID CHRCMATOGRAPHY.
APTIC-24621 03

KHOKHLOV, S. F.
INVESTIGATION OF MASS TRANSFER IN A SCRUBBER WITH TAPERED-SLOT TRAYS.
APTIC-24885 02

KIELMEYER, WILLIAM H.
FEASIBILITY OF FABRIC FILTER AS GAS-SOLID CONTACTOR TO CONTROL GASEOUS POLLUTANTS. (FINAL REPORT).
APTIC-25785 02

KIKUCHI, SHINICHI
CHEMICAL PROBLEMS IN AIR POLLUTION.
APTIC-26198 05

KILBURN, KAYE H.
HUMAN COSTS OF POLLUTED AIR.
APTIC-25561 07

KILCULLEN, M. B.
SURVEY OF CORROSION AND ATMOSPHERIC POLLUTION IN AND AROUND SHEFFIELD.
APTIC-25848 09

KIMURA, NORIO
ESTIMATION FOR INITIAL COLLECTION EFFICIENCY OF A FIBROUS MAT FILTER.
APTIC-26301 02

KIRKPATRICK, S. D.
TRAIL SOLVES ITS SULPHUR PROBLEM.
APTIC-25589 02

KIRNER, HELMUT
CATALYTIC REACTION OF CARBON MONOXIDE WITH STEAM.
APTIC-25700 02

KIRSANOV, G. P.
THE OPTIMAL NUTRITION MEDIUM OF MYCELIAL BIOMASS IN THE ANALYSIS OF BACTERIAL AIR POLLUTION.
APTIC-24838 03

KISHI, MIKOHEI
ON THE INVESTIGATION OF PUBLIC NUISANCE IN AJIMANO AREA, TAKEFU CITY.
APTIC-26028 04

KISTIAKOWSKY, G. B.
TERMINAL PROGRESS REPORT ON PUBLIC HEALTH SERVICE RESEARCH GRANT AP00349, 1/1/64 TO 12/31/68.
APTIC-25636 06

KIS, J.
THE EFFECT OF HEAT TREATMENT ON THE STRUCTURE OF KAOLIN AND ITS IN VITRO HEMOLYTIC ACTIVITY.
APTIC-25891 07

KITABATAKE, MASAYOSHI
ZINC ACETATE CYLINDER METHOD (INTEGRAL) FOR HYDROGEN SULFIDE IN THE AIR AS AIR POLLUTANT.
APTIC-25572 03

SOME OBSERVATIONS OF ANIMALS EXPOSED TO AIR POLLUTANTS ESPECIALLY SULPHUR OXIDES.
APTIC-26116 07

PRESENT STATE OF AIR POLLUTION IN YOKKAICHI AND VARIOUS MEDICAL PROBLEMS ABOUT IT.
APTIC-26305 07

KITABAYASHI, KOJI
DIFFUSION IN ANISOTROPIC FIELD OF TURBULENCE.
APTIC-25755 05

KITAGAWA, SADAHARU
ON THE INVESTIGATION OF PUBLIC NUISANCE IN AJIMANO AREA, TAKEFU CITY.
APTIC-26028 04

KITAMURA, NAOJI
STUDIES ON AIR POLLUTION OF NEW DEVELOPING INDUSTRIAL CITY MIZUSHIMA, OKAYAMA PREFECTURE.
APTIC-26043 04

ON AIR POLLUTION OF MITSUISHI-TOWN, BIZEN-TOWN AND TAMANO-CITY, OKAYAMA PREFECTURE.
APTIC-26288 04

ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE. (II).
APTIC-26302 04

KITAMURA, TOSHIO
PRELIMINARY SURVEY OF THE AIR POLLUTION IN TOKUSHIMA PREFECTURE, PART VII.
APTIC-26036 04

RESEARCHES ON AUTO EXHAUST GAS POLLUTION AND TRAFFIC NOISES IN TOKUSHIMA CITY. PART I.
APTIC-26284 04

KITAMURA, YUZURU
VENTILATION OF POLLUTED AIR IN ROOMS. VIII. STUDIES ON THEORETICAL EQUATIONS FOR VENTILATION OF POLLUTED AIR DIFFUSED HETEROGENEOUSLY IN ROOM.
APTIC-24647 06

KITA, NOBUYUKI
SOME EXPERIMENTS FOR CONTROLLING OF NITROGEN OXIDES IN DIESEL ENGINE EXHAUST GAS.
APTIC-25587 02

KITROSSKY, N. A.
IONIZATION-CHROMATOGRAPHIC DETERMINATION OF NITRILES IN THE 6ATMOSPHERE.
APTIC-24693 03

KIVILUOTO, RAIMO
PLEURAL CALCIFICATION AS A ROENTGENOLOGIC SIGN OF NON-OCCUPATIONAL ENDEMIC ANTHOPHYLLITE-ASBESTOSIS.
APTIC-22195 07

KIYOURA, R.
STUDIES ON THE REMOVAL OF SULFUR DIOXIDE FROM HOT FLUE GASES AS A MEASURE TO PREVENT AIR POLLUTION IV. RECOVERY OF FLUE GAS SULFUR AS AMMONIUM PHOSPHATE.
APTIC-24844 02

KLAINER, STANLEY
REMOTE RAMAN SPECTROSCOPY AS A POLLUTION RADAR.
APTIC-24637 03

KLEBNIKOV, O. P.
EVALUATION OF THE PROCESS OF OBTAINING AROMATIC HYDROCARBONS FROM COKE-OVEN GAS.
APTIC-24620 02

KLEIN, WERNER
INDUSTRIAL ENVIRONMENT CHEMICALS, OCCURRENCE, DECOMPOSITION AND CONSEQUENCES.
APTIC-25859 01

KLIMENTOV, A. S.
THE USE OF SILOXENE FOR DETERMINING SMALL AMOUNTS OF NITROGEN DIOXIDE.
APTIC-24839 03

KLOHR, JAMES W.
RECOVERY OF REFINERY SULFUR IN AIR-POLLUTION CONTROL.
APTIC-24792 02

KLOKE, A.
POLLUTION OF CULTIVATED PLANTS WITH LEAD FROM AUTO EXHAUST.
APTIC-24788 08

KLOSTERKOETTER, W.
ON THE ROENTGENOLOGICAL DETECTABILITY OF DUST DEPOSITS IN THE LUNGS. STUDIES ON THE ALDERSON-RANDO PHANTOM.
APTIC-18289 06

KNAPP, OTTO
DESIGN CHARACTERISTICS AND TEST RESULTS OF A NEW MULTICELL FILTER.
APTIC-24642 02

KNELSON, JOHN H.
ENVIRONMENTAL INFLUENCE ON INTRAUTERINE LUNG DEVELOPMENT.
APTIC-26207 07

KNOTKOVA-CERMAKOVA, D.
PROPERTIES OF ELECTROLYTE FILMS IN ATMOSPHERIC CORROSION.
APTIC-24655 09

KOBAYAKAWA, TAKASHI
EXHAUST GAS PURIFICATION DEVICE FOR AUTOMOTIVE INTERNAL COMBUSTION ENGINE.
APTIC-24823 02

AFTERBURNER FOR AN INTERNAL COMBUSTION ENGINE.
APTIC-25728 02

CONTROL TECHNIQUE OF MOBILE EXHAUST EMISSION.
APTIC-25894 02

KOBAYAKAWA, T.
SYMPOSIUM RECENT PROBLEMS ON AUTOMOTIVE FUELS.
APTIC-26134 02

KOBAYASHI, CHOHEI
ELECTROSTATIC PRECIPITATOR.
APTIC-26265 02

KOBAYASHI, YOSHITAKA
HORIZONTAL AND VERTICAL DISTRIBUTION OF LEAD PARTICULATES IN AIR AROUND A BUSY ROAD IN YOKOHAMA CITY.
APTIC-25881 04

KODAMA, EIICHIRO
REPORT ON AIR POLLUTION STUDY (NO. 4).
APTIC-26027 04

KODAMA, K.
METHOD OF ELIMINATING SULFUR COMPOUNDS FROM OIL WITH THE USE OF MICROBES.
APTIC-24641 02

APTIC-24641 02

MICROBIAL REMOVAL OF SULFIDE CONTAINED IN PETROLEUM.
APTIC-25101 02

KODAMA, YASUSHI
ON RELATIONSHIP OF CHRONIC RESPIRATORY DISEASES TO AIR POLLUTION.
APTIC-26032 07

KOENUMA, YUTAKA
THE DISTRIBUTION OF CARBON, VANADIUM AND NICKEL DEPOSITS ON CATALYST LAYER DURING HYDRODESULFURIZATION PROCESSES OF PETROLEUM RESIDUM.
APTIC-26129 02

KOFMAN, L. M.
DEVELOPMENT AND TESTING, WITH STANDARDIZED MIXTURES AND ON A VAPOR GENERATOR, OF AN INSTRUMENT FOR MEASURING SO3 IN COMBUSTION PRODUCTS.
APTIC-24879 03

KOGAN, YA. I.
DEVELOPMENT OF MOLECULAR CONDENSATION NUCLEI AND CONDITIONS FOR ITS OBSERVATION.
APTIC-24764 06

KOHGO, T.
A NEW DEVICE FOR CONTINUOUS DETERMINATION OF SULFUR DIOXIDE.
APTIC-26120 03

KOKIN, V. S.
DETERMINATION OF THE COEFFICIENT OF THE VITALLY NECESSARY VOLUME OF THE LUNGS OF CHILDREN.
APTIC-24690 07

KOMATSU, F.
THE EFFECT OF PROLONGED EXPOSURE TO CARBON MONOXIDE ON HUMAN HEALTH.
APTIC-25810 07

KOMATSU, K.
TRIAL MODEL OF DUST ELIMINATION DEVICE FOR IRON FOUNDRY CUPOLA.
APTIC-26108 02

KOMISSAROV, O. G.
FINE FILTRATION OF PROCESS AND WASTE GASES FROM LEAD PRODUCTION WITH THE AID OF JET BLAST BAG FILTERS.
APTIC-24771 02

KONDO, KEIICHIRO
RESEARCHES ON AUTO EXHAUST GAS POLLUTION AND TRAFFIC NOISES IN TOKUSHIMA CITY. PART I.
APTIC-26284 04

KONDO, MOTOICHI
ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE (I).
APTIC-26045 04

KONDO, Y.
THE WAVELENGTH DEPENDENCE OF ATMOSPHERIC EXTINCTION.
APTIC-24658 05

KORCHHOFF, E.
DUST FALL IN THE VICINITY OF CEMENT FACTORIES AS IT RELATES TO POSSIBLE HEALTH HAZARDS PART 2.
APTIC-24708 07

KORENEVSKIY, V. F.
TESTING OF AN EXPERIMENTAL INDUSTRIAL ABSORBER WITH MOBILE PACKING.
APTIC-26019 02

KORTE, FRIEDHELM
INDUSTRIAL ENVIRONMENT CHEMICALS, OCCURRENCE, DECOMPOSITION AND CONSEQUENCES.
APTIC-25859 01

KOSENKO, A. I.
A MODIFIED TUBULAR ELECTROFILTER FOR COLLECTING DUST SAMPLES FROM THE AIR.
APTIC-24686 03

KOSHKAROV, V. YA.
THERMODYNAMIC ANALYSIS OF THE REDUCTION OF SULFUR DIOXIDE BY METAL SULFIDES WITH THE FORMATION OF ELEMENTAL SULFUR.
APTIC-24703 06

KOSNIDER, STANISLAW
DISTURBANCE OF ACID-BASE AND ENZYME EQUILIBRIUM IN EXPERIMENTAL INTOXICATION WITH SO2 AND PROTECTIVE ACTION OF AMMONIA.
APTIC-26138 07

KOSTIN, V. V.
DISTRIBUTION OF CARBON DIOXIDE AND SULFUR CONTAINING IMPURITIES IN THE GAS DISTRIBUTION STREAM.
APTIC-25547 02

KOTIN, PAUL
INHIBITION OF CARCINOGENESIS.
APTIC-25045 07

KOUKOL, JANE
ANTHOCYANIN FORMATION AS A RESPONSE TO OZONE AND SMOG TREATMENT IN RUMEX CRISPUS L.
APTIC-24883 08

KOVACH, J. L.
THE EVALUATION OF THE IGNITION TEMPERATURE OF ACTIVATED CHARCOALS IN AIR, STEAM, OXYGEN AND OXIDES OF NITROGEN.
APTIC-26220 02

KOVALENKO, N. F.
DETERMINING THE COMPOSITION OF RAW BENZENE BY GAS-LIQUID CHROMATOGRAPHY.
APTIC-24621 03

KOYATA, KAZUO
FORMATION AND THEIR PREVENTION OF ACID SMUTS AT OIL FIRED BOILER.
APTIC-24817 02

KOZLOV, V. A.
GAS SCRUBBING IN THE HYDRODYNAMIC DUST SEPARATOR DURING ELECTROLYSIS OF ALUMINUM.
APTIC-26279 02

KRAMER, C. L.
AECIOSPORE RELEASE IN GYMNOSPORANGIUM.
APTIC-26161 01

KRANZ, MAKSYMILIAN
THE DERIVATION OF GALLIUM AND ALUMINUM FROM COAL AND GAS DUSTS AND ASHES.
APTIC-25744 02

KRASNOPEVTSEV, YU. V.
THE USE OF RADIOACTIVE TRACERS IN QUANTITATIVE STUDIES OF MOVEMENTS OF THE ATMOSPHERE.
APTIÇ-25842 05

KRASNUSHKIN, V. V.
TRENDS IN THE UTILIZATION OF THE MOST IMPORTANT FORMS OF SULFUR-CONTAINING RAW MATERIAL.
APTIC-25938 02

KRAUS, HUBERT
A PROCESS FOR THE REMOVAL OF SULFUR COMPOUNDS FROM HOT CRACKING GAS.
APTIC-24789 02

KROENING, JOHN
AUTHOR'S REPLY TO THE PRECEDING DISCUSSION.
APTIC-24774 05

KROST, K. J.
CHEMILUMINESCENT MEASUREMENT OF ATMOSPHERIC OZONE   RESPONSE CHARACTERISTICS AND OPERATING VARIABLES.
APTIC-25653 03

KRYMAN, F. J.
REACTION OF SO2 WITH POLYMER.
APTIC-24742 09

KRZYMIEN, MAREK
THE DERIVATION OF GALLIUM AND ALUMINUM FROM COAL AND GAS DUSTS AND ASHES.
APTIC-25744 02

KUBAKAWA, TETSUO
STUDIES ON THE RELATIONSHIP BETWEEN AIR POLLUTION AND INFANTILE ASTHMA ATTACKS. USING THE SO2 CONCENTRATION IN THE AIR AS AN INDICATOR.
APTIC-26051 07

KUBOTA, MASARU
EXPERIMENTAL STUDY ON BLOOD PRESSURE IN CARBON MONOXIDE POISONING. (CHRONIC CARBON MONOXIDE POISONING SERIES XI).
APTIC-25802 07

KULAGIN, YU. Z.
GAS RESISTANCE OF PINE AND BIRCH.
APTIC-24738 08

KULIKOVA, L. A.
THERMODYNAMIC ANALYSIS OF THE REDUCTION OF SULFUR DIOXIDE BY METAL SULFIDES WITH THE FORMATION OF ELEMENTAL SULFUR.
APTIC-24703 06

KULIKOV, V. O.
IMPROVING THE GAS CLEANING ON 100 T OXYGEN CONVERTERS.
APTIC-24809 02

KUMMLER, R. H.
PRODUCTION AND DESTRUCTION MECHANISMS FOR O2 (1 DELTA G) IN THE LOWER ATMOSPHERE.
APTIC-24836 05

KUNITAKE, EIZABURO
ON RELATIONSHIP OF CHRONIC RESPIRATORY DISEASES TO AIR POLLUTION.
APTIC-26032 07

KUNITAKE, ELIZABURO
RELATIONSHIP BETWEEN AIR POLLUTION AND ASTHMATIC DISEASES AMONG PRIMARY SCHOOL CHILDREN IN KITA-KYUSHU. PART I. STATISTICAL ANALYSIS BASED ON QUESTIONNAIRES.
APTIC-25739 07

KUO, T. J.
PROPAGATION VELOCITY AND FLAME SPREAD THROUGH SIMULATED FUEL BEDS.
APTIC-25989 06

KURCHATOVA, G.
FEATURES OF A COMBINED ACTION OF SULFUROUS GAS AND CARBON MONOXIDE IN THEIR JOINT PRESENCE IN THE ATMOSPHERE.
APTIC-25790 07

KURFIS, K. R.
ATMOSPHERIC TURBIDITY OVER THE UNITED STATES, 1961-1966.
APTIC-12595 05

KUSAGAYA, HARUYUKI
ELECTROSTATIC PRECIPITATOR.
APTIC-26265 02

KUSAMA, AKIO
LIQUEFIED NATURAL GAS AS INDUSTRIAL FUEL.
APTIC-25893 02

KUSUMOTO, M.
THE CASCADE CENTRIFETER FOR THE PARTICLE SIZE DETERMINATION AND ITS APPLICATION TO THE CHEMICAL ANALYSIS BY THE RING OVEN.
APTIC-26292 03

KUVALDINA, N. N.
COMPLEXOMETRIC DETERMINATION OF SULFUR TRIOXIDE AND SULFUR DIOXIDE IN WASTE PROCESS GASES.
APTIC-26067 03

KUWATA, M.
PROPAGATION VELOCITY AND FLAME SPREAD THROUGH SIMULATED FUEL BEDS.
APTIC-25989 06

KWAN, TAKAO
THE DISTRIBUTION OF CARBON, VANADIUM AND NICKEL DEPOSITS ON CATALYST LAYER DURING HYDRODESULFURIZATION PROCESSES OF PETROLEUM RESIDUM.
APTIC-26129 02

LAAMANEN, ARVO
ESTIMATION OF THE ANNUAL AVERAGE OF PARTICLE FALL BY MONTHLY VALUES. TOTAL DUSTFALL AND DUSTFALL COMPONENTS.
APTIC-24738 03

THE USE OF SNOW SAMPLES IN AIR POLLUTION STUDIES.
APTIC-24740 03

LACEY, J. A.
PILOT-PLANT INVESTIGATIONS OF THE DESULPHURISATION OF LIGHT DISTILLATES.
APTIC-25962 02

LADNER, W. R.
A METHOD FOR THE ESTIMATION OF SULPHUR TRIOXIDE.
APTIC-25940 03

LAHMANN, ERDWIN
DEPENDENCE OF SULFUR DIOXIDE ABSORPTION ON TEMPERATURE IN THE WEST-GAEKE METHOD.
APTIC-24652 03

LAMANTIA, CHARLES R.
TACKLING THE PROBLEM OF NITROGEN OXIDES.
APTIC-24922 02

LAMBERT, JACK L.
CELLULOSE SUPPORTED THORIUM-ALIZARIN RED S REAGENT FOR FLUORIDE ION DETERMINATION.
APTIC-26259 03

LAMOREAUX, W. F.
THE FELD SCRUBBER FOR CLEANING METALLURGICAL SMOKE.
APTIC-24724 02

LANDAU, STEPHEN A.
PROJECT REPORT LEAD.
APTIC-26215 07

LAND, GEORGE W.
COAL AND CLEAN AIR.
APTIC-23726 01

LANE, R. E.
A FOLLOW-UP STUDY OF LEAD WORKERS.
APTIC-26177 07

LANGEMANN, HORST
MASS AND MOMENTUM EQUATIONS OF ISOTHERMAL NON-ISOBARIC GAS-LIQUID PHASE REACTIONS. III.
APTIC-12835 06

LANGER, JOHANN
PROCESS FOR THE REMOVAL AND RECLAMATION OF SULFUR DIOXIDE FROM FLUE GASES.
APTIC-26164 02

LANGMANN, R.
OBJECTIONABLE SOOT EMISSIONS.
APTIC-25549 01

LARSON, GORDON P.
PROGRESS IN SMOG CONTROL AT LOS ANGELES.
APTIC-24744 04

A PROGRESS REPORT ON CONTROLLING ATMOSPHERIC POLLUTANTS.
APTIC-25590 02

LASSEUR, CLAUDE
DEVICE FOR SAMPLING AEROSOLS.
APTIC-25699 03

LAUDIEN, KURT
SEPARATION EFFICIENCY OF ROOM AIR STERILIZATION EQUIPMENT COMPARED WITH DUST PARTICLES OF DIFFERENT SIZES.
APTIC-25568 02

LAUGUSCH, EDMUND J.
SULFUR DIOXIDE.
APTIC-25808 02

LAUSMANN, JERRY S.
BURNER MEANS FOR ELIMINATING SMOKE.
APTIC-25570 02

LAWRIE, W. B.
DUST COLLECTION IN INDUSTRY.
APTIC-25538 02

LAWTHER, P. J.
CARBON MONOXIDE IN TOWN AIR AN INTERIM REPORT.
APTIC-25799 04

LEAVER, EDMUND S.
FERRIC SULPHATE AND SULPHURIC ACID FROM SULPHUR DIOXIDE AND AIR.
APTIC-26142 02

LEBEDINSKIY, A. B.
CONCERNING INDIRECT DETERMINATION OF THE REPEATABILITY OF LARGE-SCALE NEAR-GROUND INVERSIONS IN CITIES OF SIBERIA.
APTIC-25811 05

LEGGETT, D. C.
FEASIBILITY OF TUNNEL DETECTION BY TRACE GAS ANALYSIS.
APTIC-24577 03

LEH, H. O.
POLLUTION OF CULTIVATED PLANTS WITH LEAD FROM AUTO EXHAUST.
APTIC-24788 08

LEONE, NICHOLAS C.
THE EFFECTS OF THE ABSORPTION OF FLUORIDE. V. THE CHEMICAL DETERMINATION OF FLUORIDE IN HUMAN SOFT TISSUES FOLLOWING PROLONGED INGESTION OF FLUORIDE AT VARIOUS LEVELS.
APTIC-25946 07

LEROUX, J.
IMPROVEMENT OF X-RAY SPECTROGRAPHIC ANALYSIS OF FILTRATION OF THE L LINES FROM THE PRIMARY BEAM.
APTIC-25822 03

LESOINE, L. GRANT
EFFECT OF PARTICLE SIZE ON THE DETERMINATION OF INORGANIC SULFUR IN COAL.
APTIC-24725 03

LETOURNEAU, D. J.
LIPID COMPONENTS OF SCLEROTIA OF SCLEROTINIA SCLEROTIORUM.
APTIC-12615 06

LEUPEN, M. S.
INVESTIGATION OF THE RELATION BETWEEN THE HUMIDITY OF RESIDENCES AND CHRONIC ATTACKS OF THE BRONCHI OF MINORS.
APTIC-24772 07

LEVADIE, B.
THE ATMOSPHERE TESTING DILEMMA.
APTIC-25821 03

LEVINS, PHILIP L.
STUDY OF LONG-TERM ATMOSPHERIC TRACE CONTAMINANT MONITORING AND CONTROL. (FINAL REPORT).
APTIC-25686 03

LEVY, ARTHUR
PAINT INDUSTRY SMOG CHAMBER. I. DESIGN AND VALIDATION OF A SMOG CHAMBER.
APTIC-24711 07

LEWIS, CLIFFORD J.
SULFUR EXTRACTION USING TRICHLOROETHYLENE IN PRESENCE OF LIMESTONE, TRONA, AND SODA ASH.
APTIC-25552 02

LEWIS, C. A.
SATURATED HYDROCARBONS IN SKIN SURFACE LIPIDS.
APTIC-26221 07

LEWIS, JAMES
PEROXYACYL NITRATES.
APTIC-25982 05

LEWIS, TRENT R.
EFFECTS ON CANINE PULMONARY FUNCTION VIA INDUCED NO2 IMPAIRMENT, PARTICULATE INTERACTION, AND SUBSEQUENT SOX.
APTIC-24940 07

A NEW GLUE HOLDS RIGID CUP ECG SKIN ELECTRODES FOR 24 HOURS AND LONGER.
APTIC-25626 07

LINDAHL, DONALD R.
PIPELINE GAS FROM LIGNITE GASIFICATION CURRENT COMMERCIAL ECONOMICS.
APTIC-24727 10

LINDBLAD, AXEL RUDOLF
PROCEDURE FOR MANUFACTURING SULFUR BY THE REDUCTION OF SULFUROUS ACID.
APTIC-25972 02

LINDBLAD, A. R.
METHOD FOR MANUFACTURING SULFUR.
APTIC-25787 02

METHOD FOR MANUFACTURING SULFUR BY THE REDUCTION OF SULFUR DIOXIDE.

APTIC-25795 02

LINDEKEN, C. L.
SURFACE COLLECTION EFFICIENCY OF LARGE-PORE MEMBRANE FILTERS.
APTIC-22169 03

LINDE, HARRY W.
ESTIMATION OF SMALL AMOUNTS OF FLUORIDE IN BODY FLUIDS.
APTIC-24720 07

LINDNE, J. H. O.
METHOD OF MANUFACTURING SULFUR BY THE REDUCTION OF SULFUR DIOXIDE.
APTIC-25974 02

LINDHOLM, E.
THE PHOTOELECTRON SPECTRA OF O2, N2 AND CO.
APTIC-24889 06

LIPTAY, G.
THE ROLE OF THE SAMPLE HOLDER IN THE THERMAL INVESTIGATION OF PROCESSES ACCOMPANIED BY THE SPLITTING OFF OF CO.
APTIC-24653 06

LITTLE, C. GORDON
ACOUSTIC METHODS FOR THE REMOTE PROBING OF THE LOWER ATMOSPHERE.
APTIC-26150 03

LITYNSKI, T.
PRELIMINARY EVALUATION OF CEMENT DUST FROM ELECTROFILTERS AS A POTASSIUM FERTILIZER.
APTIC-25609 02

LOBEYEVA, N. V.
EFFECTS OF CERTAIN CHEMICAL SUBSTANCES ON PROTEIN CONTENT OF BLOOD SERUM AND OF BONE MARROW.
APTIC-25738 07

LODGE, J. P.
DETECTION OF POLLEN FLAVONOIDS BY FLUORESCENCE ON IMPREGNATED PAPERS.
APTIC-25928 03

LODI, CHARLOTTE
OZONE AND LIPID PEROXIDATION.
APTIC-24953 07

LOEHR, E.
ON THE ROENTGENOLOGICAL DETECTABILITY OF DUST DEPOSITS IN THE LUNGS. STUDIES ON THE ALDERSON-RANDO PHANTOM.
APTIC-18289 06

LOGAN, JOHN O.
SUMMARY OF STATEMENT OF JOHN O. LOGAN AND C. G. GERHOLD OF UNIVERSAL OIL PRODUCTS CO., DES PLAINES, ILL., WASHINGTON, D. C., MARCH 20, 1970.
APTIC-24696 02

LOHS, KARLHEINZ
TASKS AND PROBLEMS OF INDUSTRIAL TOXICOLOGY FROM THE VIEWPOINT OF TECHNICAL CHEMISTRY.
APTIC-26274 07

LOMAYA, O. V.
DEPENDENCE BETWEEN THE CONCENTRATION OF AEROSOLS AND THE INTENSITY OF TURBULENT INTERCHANGE IN LOWER ATMOSPHERE.
APTIC-24904 05

LORENZ, ERNST
CATALYTIC REACTION OF CARBON MONOXIDE WITH STEAM.
APTIC-25700 02

LOVELOCK, J. E.
PALLADIUM DEVICES FOR GAS CHROMATOGRAPHY.
APTIC-24665 03

LOVE, GORY J.
HEALTH EFFECTS RESEARCH PROGRAM OF THE NATIONAL AIR POLLUTION CONTROL ADMINISTRATION.
APTIC-26213 12

LOWE, H. J.
PRESENT PERFORMANCE AND SCOPE FOR IMPROVEMENT IN POWER-STATION ELECTROSTATIC PRECIPITATORS.
APTIC-26143 02

LOWRIMORE, GENE
REGRESSION USING 'HOCKEY STICK' FUNCTION.
APTIC-25625 07

LUCAS, D. H.
AIR POLLUTION MEASUREMENTS. DEVELOPMENTS IN AIR POLLUTION MEASUREMENT.
APTIC-24715 03

LUCE, CHARLES F.
UTILITY RESPONSIBILITY FOR PROTECTION OF THE ENVIRONMENT.
APTIC-24951 01

LUDWIG, F. L.
A PRACTICAL, MULTIPURPOSE URBAN DIFFUSION MODEL FOR CARBON MONOXIDE. (FINAL REPORT).
APTIC-25995 05

LUDYGA, K.
DISTURBANCE OF ACID-BASE AND ENZYME EQUILIBRIUM IN EXPERIMENTAL INTOXICATION WITH SO2 AND PROTECTIVE ACTION OF AMMONIA.
APTIC-26138 07

LUETTGEN, HANS
DESIGN CHARACTERISTICS AND TEST RESULTS OF A NEW MULTICELL FILTER.
APTIC-24642 02

LUTZ, F.
CARBON MONOXIDE PARTIAL PRESSURE IN TISSUE OF DIFFERENT ANIMALS.
APTIC-25562 07

LYLES, GEORGE R.
ATOMIC ABSORPTION SPECTROSCOPY OF ALUMINUM.
APTIC-26098 03

MACINTIRE, W. H.
MEASUREMENT OF ATMOSPHERIC FLUORINE. ANALYSES OF RAIN WATERS AND SPANISH MOSS EXPOSURES.
APTIC-24717 04

MACKENNA, R. M. B.
SATURATED HYDROCARBONS IN SKIN SURFACE LIPIDS.
APTIC-26221 07

MACK, PAULINE BEERY
A COMPARISON OF THE EFFECT ON RAYON FABRICS OF VARIOUS GASES UNDER CONTROLLED CONDITIONS.
APTIC-25772 09

MACNAMEE, JAMES K.
TOXICITY OF NO2 VAPORS AT VERY LOW LEVELS. A PRELIMINARY REPORT.
APTIC-24588 07

MADDOX, R. N.
LEASE-GAS SWEETENING. PART 6. HOT CARBONATE--ANOTHER POSSIBILITY.
APTIC-24871 02

MADELAINE, GUY
FORMATION OF PARTICLES OF PHOTOLYTIC ORIGIN IN AIR.
APTIC-25564 05

MADER, PAUL P.
MOTOR EXHAUST COMPOSITION IN RELATION TO SELECTED FUELS.
APTIC-24729 01

DETERMINATION OF SMALL AMOUNTS OF SULFURIC ACID IN THE ATMOSPHERE.
APTIC-24874 04

MAEHLY, ANDREAS C.
VOLATILE TOXIC COMPOUNDS.
APTIC-25598 03

MAEJIMA, YOSHINOBU
STUDIES ON THE RELATIONSHIP BETWEEN AIR POLLUTION AND INFANTILE ASTHMA ATTACKS. USING THE SO2 CONCENTRATION IN THE AIR AS AN INDICATOR.
APTIC-26051 07

MAGNUS, L.
ON THE ROENTGENOLOGICAL DETECTABILITY OF DUST DEPOSITS IN THE LUNGS. STUDIES ON THE ALDERSON-RANDO PHANTOM.
APTIC-18289 06

MAHMUD, M.
IMPROVEMENT OF X-RAY SPECTROGRAPHIC ANALYSIS OF FILTRATION OF THE L LINES FROM THE PRIMARY BEAM.
APTIC-25822 03

MAHONEY, ALLAN R.
ACOUSTIC SOUNDING--A NEW APPROACH TO THE STUDY OF ATMOSPHERIC STRUCTURE.
APTIC-25622 03

MAJERNIK, ONDREJ
CAN STOMATA PLAY A PART IN PROTECTING PLANTS AGAINST AIR POLLUTANTS
APTIC-25536 08

MALACHOWSKI, JAN
PURIFICATION OF INDUSTRIAL EXHAUST GASES.
APTIC 25743 02

MALAKHOV, S. G.
THE USE OF RADIOACTIVE TRACERS IN QUANTITATIVE STUDIES OF MOVEMENTS OF THE ATMOSPHERE.
APTIC-25842 05

MALORNY, G.
CARBON MONOXIDE PARTIAL PRESSURE IN TISSUE OF DIFFERENT ANIMALS.
APTIC-25562 07

MAMAEV, S. A.
SOME PECULIARITIES OF THE SUSCEPTIBILITY OF SCOTCH PINE TO SULFUR DIOXIDE INJURY.
APTIC-24853 08

MAMAEV, S.A.
CURRENT CONDITIONS AND SCIENTIFIC PROBLEMS IN STUDYING THE INJURIOUS EFFECTS OF INDUSTRIAL POLLUTANTS ON PLANTS AND IN DEVELOPING METHODS FOR CONTROLLING THEM IN THE URALS.
APTIC-24867 08

MAMMARELLA, LUIGI
PRINCIPAL AGENTS OF POLLUTION AND THEIR RATE OF DISPERSAL.
APTIC-24776 04

MANCUSO, ROBERT L.

A PRACTICAL, MULTIPURPOSE URBAN DIFFUSION MODEL FOR CARBON MONOXIDE. (FINAL REPORT).
APTIC-25995 05

MANDRIOLI, P.
LEADED PARTICLES IN URBAN AREAS.
APTIC-25635 04

MANNY, E. S.
SYSTEMS STUDY OF NITROGEN OXIDE CONTROL METHODS FOR STATIONARY SOURCES.
APTIC-12619 02

MANOWITZ, B.
THE WESTERN COAL DEPOSITS A NATIONAL SOURCE OF POWER.
APTIC-24955 01

MANSFIELD, T. A.
CAN STOMATA PLAY A PART IN PROTECTING PLANTS AGAINST AIR POLLUTANTS
APTIC-25536 08

MANVELYAN, M. G.
SIMULTANEOUS RECOVERY OF LOW-CONCENTRATION SULFUR OXIDES AND NITROGEN OXIDES WITH ALKALIES AND CARBONATES. IV. ABSORPTION WITH MAGNESIUM HYDROXIDE.
APTIC-24704 06

MANYAI, S.
THE EFFECT OF HEAT TREATMENT ON THE STRUCTURE OF KAOLIN AND ITS IN VITRO HEMOLYTIC ACTIVITY.
APTIC-25891 07

MARGARD, W. L.
THE DYNAMIC BEHAVIOR OF AEROSOLS.
APTIC-25779 06

MARQUEZ-MAYAUDON, E.
EVALUATION OF AIR POLLUTION IN THE VALLE DE MEXICO.
APTIC-26297 04

MARSEE, FREDERICK J.
EXHAUST BACK PRESSURE CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE.
APTIC-23821 02

MARTIN, ROBERT
A GUIDE TO THE AIR QUALITY ACT OF 1967.
APTIC-24930 12

MARWIG, UWE D.
PIPELINE GAS FROM LIGNITE GASIFICATION CURRENT COMMERCIAL ECONOMICS.
APTIC-24727 10

MASEK, V.
DUST AND SOOT NUISANCES AT A METALLURGICAL COKING PLANT AND IN ITS ENVIRONMENT.
APTIC-26040 01

MASHEK, V.
SOOT OBTAINED FROM SOLID FUELS.
APTIC-25545 01

MASHKOVA, G. B.
ATMOSPHERIC STRATIFICATION CHARACTERISTICS IN INVERSIONS.
APTIC-25633 05

MASLOVA, G. V.
ATMOSPHERIC CORROSION OF TALLIUM.
APTIC-24619 09

MASUDA, SENICHI
ELECTRODYNAMIC BEHAVIOR OF CHARGED AEROSOL PARTICLES IN AN INHOMOGENEOUS ALTERNATING FIELD AND POSSIBILITIES OF ITS APPLICATION IN DUST ENGINEERING.
APTIC-26041 06

MATEOSOV, A. KH.
TRIBUTARY VENTILATION WITH A FOAM FILTER.
APTIC-24887 02

MATHIEU, PIERRE
IMPROVED PROCEDURE FOR MANUFACTURING SULFUR.
APTIC-24786 02

MATSUDA, YOSHIO
STUDIES ON AIRBORNE FUNGAL FLORA. PART II. STUDY ON AIRBORNE FUNGI IN REFERENCE TO ATMOSPHERIC FACTORS AND AIR POLLUTION.
APTIC-26307 04

MATSUMAE, A.
QUANTITATIVE DETERMINATION OF METALLIC AIR POLLUTANTS BY EMISSION SPECTROSCOPIC ANALYSIS.
APTIC-26009 03

MATSUMOTO, HISAO
EFFECT OF AIR POLLUTION ON THE INHABITANTS IN OHUTA WITH SPECIAL REFERENCE TO THE FINDINGS OF LUNG FUNCTION AND CHEST X-RAY FILM.
APTIC-26024 07

MATSUMOTO, KOKU
VENTILATION OF POLLUTED AIR IN ROOMS. VIII. STUDIES ON THEORETICAL EQUATIONS FOR VENTILATION OF POLLUTED AIR DIFFUSED HETEROGENEOUSLY IN ROOM.
APTIC-24647 06

MATSUMOTO, K.
DISPOSAL METHOD OF SULFUR OXIDE (SO2, SO3)-CONTAINING GAS.
APTIC-26105 02

MATSUMOTO, SHIRO
STUDIES ON DROPLET SIZE SPRAYED FROM HOLLOW CONE NOZZLES.
APTIC-26194 06

MATSUMURA, YUKIO
THE EFFECT OF O3, NO2, AND SO2 EXPOSURE ON THE EXPERIMENTAL ASTHMA IN GUINEAPIGS.
APTIC-26117 07

MATSUOKA, CHO
RESEARCHES ON AUTO EXHAUST GAS POLLUTION AND TRAFFIC NOISES IN TOKUSHIMA CITY. PART I.
APTIC-26284 04

MATSUOKA, MASUMI
PRELIMINARY SURVEY OF THE AIR POLLUTION IN TOKUSHIMA PREFECTURE, PART VII.
APTIC-26036 04

MATSUSHIMA, RYOHEI
AN EXPERIMENT STUDY ON EXHAUST GASES OF KEROSENE WITH VEHICLE ENGINE.
APTIC-25754 01

MATSUZAKI, SHOICHI
MAINTENANCE AND MANAGEMENT OF AUTOMATIC-TYPE AIR CLEANERS.
APTIC-25723 02

MATTY, ROBERT EWING
INSTALLATION FOR THE ABSORPTION OF SULFUR DIOXIDE.
APTIC-24750 02

MAYKOV, V. P.
EVALUATION OF THE PROCESS OF OBTAINING AROMATIC HYDROCARBONS FROM COKE-OVEN GAS.
APTIC-24620 02

MAYO, LOUIS
THE RELATIONSHIP OF TECHNOLOGY ASSESSMENT TO ENVIRONMENTAL MANAGEMENT.
APTIC-25782 12

MAY, K. R.
TOXICITY OF OPEN AIR TO A VARIETY OF MICROOGANISMS.
APTIC-25698 08

MAZIARKA, STEFAN
THE DEATH RATE DUE TO LUNG CANCER IN PEOPLE LIVING IN SELECTED TOWNS IN POLAND IN THE POLLUTION OF THE ATMOSPHERE.
APTIC-24935 07

MCALLISTER, LINDAY G.
ACOUSTIC SOUNDING--A NEW APPROACH TO THE STUDY OF ATMOSPHERIC STRUCTURE.
APTIC-25622 03

MCATEE JR, JAMES L.
CRYSTAL STRUCTURE DETERMINATION OF STABLE OZONIDES.
APTIC-25953 06

MCCALLUM, R. I.
THE WORK OF AN OCCUPATIONAL HYGIENE SERVICE IN ENVIRONMENTAL CONTROL.
APTIC-25767 07

MCCARROLL, JAMES
POSSIBLE EFFECTS OF AIR POLLUTION ON THE COURSE OF INFECTIOUS RESPIRATORY DISEASE.
APTIC-25999 07

MCCARTY, CHARLES P.
EFFECT OF COLD STORAGE ON THE FLUORIDE CONTENT OF ALFALFA.
APTIC-24886 03

MCCLOSKEY, JOHN P.
SPECIFIC SPECTROPHOTOMETRIC MICRODETERMINATION OF BERYLLIUM.
APTIC-25919 03

MCCORMICK, R. A.
ATMOSPHERIC TURBIDITY OVER THE UNITED STATES, 1961-1966.
APTIC-12595 05

MCCUNE, DELBERT C.
IMPLICATIONS OF AIR POLLUTION FOR PLANT LIFE.
APTIC-26219 08

MCCUTCHAN, MORRIS H.
INFLUENCE OF CLIMATE AND TOPOGRAPHY ON OXIDANT AIR POLLUTION CONCENTRATIONS THAT DAMAGE CONIFER FORESTS IN SOUTHERN CALIFORNIA.
APTIC-25792 05

MCCUTCHEN, GARY D.
A COMPARISON OF NAPCA AND IIA SOURCE SAMPLING METHODS.
APTIC-24582 03

MCELROY, JAMES L.
ST. LOUIS DISPERSION STUDY. VOLUME I. INSTRUMENTATION, PROCEDURES, AND DATA TABULATIONS.
APTIC-25997 05

MCEWEN, W. K.
EYE IRRITATION FROM AIR POLLUTION.
APTIC-24710 07

A STUDY OF THE EFFECTS OF AIR POLLUTANTS ON THE EYE.
APTIC-25756 07

MCFARLAND, DAVID G.

FORECASTING COH LEVELS AT SIX OUTLYING SAMPLING STATIONS IN ALLEGHENY COUNTY USING STATISTICAL CORRELATIONS DERIVED FROM THE DOWNTOWN STATION.
APTIC-26280 05

MCHENRY, CHARLES R.
MONITORING OF FLUORIDE CONTENT OF AIR, WATER, AND VEGETATION.
APTIC-24801 04

MCKEE, RALPH HARPER
PROCESS FOR SEPARATING SULPHUR DIOXIDE FROM GAS MIXTURES AND APPARATUS THEREFOR.
APTIC-25614 02

MCKENNA, F. E.
METHODS OF FLUORINE AND FLUORIDE ANALYSIS - I.
APTIC-25615 03

METHODS OF FLUORINE AND FLUORIDE ANALYSIS - II.
APTIC-25616 03

METHODS OF FLUORINE AND FLUORIDE ANALYSIS - III.
APTIC-25617 03

MCLENDON, VERDA
OXIDES OF NITROGEN AS A FACTOR IN COLOR CHANGES OF USED AND LAUNDERED COTTON ARTICLES.
APTIC-24608 09

MCMAHON, S. M.
PLEURAL SURFACE PRESSURE IN DOGS.
APTIC-24664 07

MCMULLEN, THOMAS B.
FLUORIDE CONCENTRATIONS IN THE AMBIENT AIR.
APTIC-24736 04

MCNELIS, D. N.
AEROSOL PREPARATION, GENERATION, AND ASSESSMENT. PROJECT HARE.
APTIC-25760 03

MCPHERSON, JEAN
SULFUR EXTRACTION USING TRICHLOROETHYLENE IN PRESENCE OF LIMESTONE, TRONA, AND SODA ASH.
APTIC-25552 02

MCREYNOLDS, L. A.
THE AIR POLLUTION RESEARCH PROGRAM OF THE COORDINATING RESEARCH COUNCIL.
APTIC-25965 12

MC, GUIRE
REMOVABLE PROTECTIVE BAND OR BANDAGE FOR TIRE INNER TUBES.
APTIC-25646 06

MEEKER, JAMES E.
POLYNUCLEAR AROMATIC HYDROCARBON COMPOSITION OF THE ATMOSPHERE IN SOME LARGE AMERICAN CITIES.
APTIC-25693 04

MEEK, S. F.
A PRACTICAL METHOD FOR THE RAPID DETERMINATION OF LEAD WHEN FOUND IN THE ATMOSPHERE.
APTIC-25932 03

MEIER, H.
EXAMINATION OF THE BEHAVIOR OF HIGH VOLTAGE INSULATORS UNDER POLLUTION CONDITIONS, USING A CONVENTIONAL TESTING METHOD, WITH PARTICULAR REFERENCE TO THE SELF-CLEANING APTITUDE.
APTIC-25926 11

MEIN JR, WILLIAM WALLACE
THE CALAVERAS CEMENT CO. DUST SUIT.
APTIC-25642 12

MELOAN, CLIFTON E.
SIMULTANEOUS DETERMINATION OF CARBON AND SULFUR IN ORGANIC COMPOUNDS BY GAS CHROMATOGRAPHY.
APTIC-24901 03

MERENDA, PAUL-VICTOR-JOSEPH
IMPROVEMENTS IN MACHINERY USED TO DRESS HIDES, SKINS, AND SIMILAR MATERIALS.
APTIC-25644 06

MERLO, A. L.
COMBUSTION CHAMBER INVESTIGATIONS BY MEANS OF MICROWAVE RESONANCES.
APTIC-26268 03

MERRILL, J. A.
A REVIEW AND COMPARISON OF SELECTED UNITED STATES ENERGY FORECASTS.
APTIC-26085 01

METTEE, H. D.
FLUORESCENCE AND PHOSPHORESCENCE OF SO2 VAPOR.
APTIC-24894 06

METTIER JR, STACY R.
A STUDY OF THE EFFECTS OF AIR POLLUTANTS ON THE EYE.
APTIC-25756 07

METTIER, S. R.
EYE IRRITATION FROM AIR POLLUTION.
APTIC-24710 07

MEYERS, F. H.
EYE IRRITATION FROM AIR POLLUTION.
APTIC-24710 07

MEYER, ANDRE
TRANSFER VALUES OF CARBON MONOXIDE IN NORMAL HUMANS IN A STABLE VENTILATION STATE AT REST.
APTIC-24931 06

MEYER, E. W.
THE DESIGN AND CONSTRUCTION OF A PHOTOELECTRONIC SCANNING MACHINE FOR SIZING MICROSCOPIC PARTICLES.
APTIC-25943 03

MEYER, RICHARD E.
ENEMIES IN THE AIR.
APTIC-24920 02

MIDDLETON, JOHN T.
BIOLOGICAL SYSTEMS FOR THE IDENTIFICATION AND DISTRIBUTION OF AIR POLLUTANTS.
APTIC-24766 08

SUMMARY OF THE AIR QUALITY ACT OF 1967.
APTIC-24950 12

MIKIROV, A. E.
MEASUREMENT OF PARTICLE-SIZE DISTRIBUTION IN CLOUDS AND FOGS.
APTIC-25955 03

A PHOTOELECTRIC METHOD OF INVESTIGATING THE DISTRIBUTION OF PARTICLE SIZE OF PRECIPITATION.
APTIC-26263 03

MIKITA, J. J.
EXHAUST MANIFOLD THERMAL REACTORS - A SOLUTION TO THE AUTOMOTIVE EMISSIONS PROBLEM.
APTIC-24722 02

MILLER, H. H.
EVALUATION OF METHODS FOR THE DETERMINATION OF HALOGENATED HYDROCARBONS IN AIR.
APTIC-25692 03

MILLER, PAUL R.
INFLUENCE OF CLIMATE AND TOPOGRAPHY ON OXIDANT AIR POLLUTION CONCENTRATIONS THAT DAMAGE CONIFER FORESTS IN SOUTHERN CALIFORNIA.
APTIC-25792 05

MILLER, ROGER A.
MOBILE DUST AND DEBRIS COLLECTION AND INERTIAL DUST SEPARATOR FOR AIRPORT RUNWAYS AND/OR STREET CLEANING.
APTIC-25709 02

MILLER, RONALD D.
CONVERSION OF URBAN REFUSE TO OIL.
APTIC-25753 02

MILLER, R. R.
DETECTION OF POLLEN FLAVONOIDS BY FLUORESCENCE ON IMPREGNATED PAPERS.
APTIC-25928 03

MILLER, SALO E.
PAINT INDUSTRY SMOG CHAMBER. I. DESIGN AND VALIDATION OF A SMOG CHAMBER.
APTIC-24711 07

MILLIGAN, M. F.
EVALUATION OF METHODS FOR THE DETERMINATION OF HALOGENATED HYDROCARBONS IN AIR.
APTIC-25692 03

MILMAN, Y.
THE MAXIMA OF SUTTON'S EQUATION CORRECTED FOR DEPOSITION.
APTIC-25669 05

MILNES, DALE J.
OZONE. A HANDBOOK OF PHYSICAL AND TECHNICAL DATA.
APTIC-22731 01

MINDEN, H.
ANIMAL EXPERIMENT INVESTIGATIONS OF CHRONIC CARBON DISULFIDE POISONING.
APTIC-25567 07

MINODA, T.
METHOD OF ELIMINATING SULFUR COMPOUNDS FROM OIL WITH THE USE OF MICROBES.
APTIC-24641 02

APTIC-24641 02

MINODA, Y.
MICROBIAL REMOVAL OF SULFIDE CONTAINED IN PETROLEUM.
APTIC-25101 02

MIREV, D.
EFFECT OF SURFACE-ACTIVE AGENTS ON THE RATE OF ABSORPTION.
APTIC-24790 06

MITCHELL, R. I.
THE DYNAMIC DILUTION OF AEROSOLS BY MIXING WITH CLEAN AIR.
APTIC-25778 02

THE DYNAMIC BEHAVIOR OF AEROSOLS.
APTIC-25779 06

A TRACER TECHNIQUE TO MEASURE DEPOSITION OF STACK EMISSIONS.
APTIC-26139 03

MITCHELL, R. S.
A COOPERATIVE STUDY OF CERTAIN MEASUREMENTS OF EMPHYSEMA.
APTIC-24804 07

MITTLER, SIDNEY
TOXICITY OF OZONE. II. EFFECT OF OXYGEN AND CARBON DIOXIDE UPON ACUTE TOXICITY.
APTIC-26188 07

TOXICITY OF OZONE. IV. SILICONE AEROSOLS AND ALCOHOL VAPOR THERAPY IN OZONE POISONING.
APTIC-26217 07

MIURA, EIICHI
REPORT ON AIR POLLUTION STUDY (NO. 4).
APTIC-26027 04

MIX, DAVID D.
THE MISDEMEANOR APPROACH TO POLLUTION CONTROL.
APTIC-25597 12

MIZUNO, SHIGERU
MANUFACTURING METHOD FOR SULFUR DIOXIDE ABSORBENT.
APTIC-24815 02

MOBERLY, LAWRENCE E.
AIR HUMIDITY AND BRUSH CONTACT DROP THE EFFECT OF WATER VAPOR, SULFUR DIOXIDE, AND HYDROGEN SULFIDE.
APTIC-24943 09

MOCHIZUKI, SADAMU
ON THE SIMULTANEOUS MEASUREMENTS OF THE PARTICLE SIZE DISTRIBUTION OF RADIOACTIVE CHARGED AEROSOLS AND CONCENTRATION RATIO OF POSITIVE TO NEGATIVE.
APTIC-25834 03

MOEHLE, FRED W.
FLY ASH AIDS IN SLUDGE DISPOSAL.
APTIC-25694 02

MOENIG, F. J.
LIGHT-SCATTERING METHOD OF MEASURING AEROSOL PARTICLES.
APTIC-24974 03

MOFFAT, WILLIAM E. G.
EUROPEAN LEGISLATION ON POLLUTION AND WASTE DISPOSAL.
APTIC-26070 12

MOHLER, JOHN
CARBON MONOXIDE LEVELS IN ACUTE MYOCARDIAL INFARCTION.
APTIC-25578 07

MOHSENIN, MOHAMMAD
CARBON MONOXIDE LEVELS IN ACUTE MYOCARDIAL INFARCTION.
APTIC-25578 07

MOLOTCH, HARVEY
AIR POLLUTION A SOCIOLOGICAL PERSPECTIVE.
APTIC-25983 13

MOLVING, TOVE AAS-WANG
THE EFFECT OF AIR POLLUTANTS ON COTTON.
APTIC-24999 09

MONKMAN, J. L.
ANALYSIS OF POLYCYCLIC HYDROCARBONS IN PARTICULATE POLLUTANTS.
APTIC-25920 03

MOON, ALBERT E.
A PRACTICAL, MULTIPURPOSE URBAN DIFFUSION MODEL FOR CARBON MONOXIDE. (FINAL REPORT).
APTIC-25995 05

MOORE, G. E.
ANALYSIS OF POLYCYCLIC HYDROCARBONS IN PARTICULATE POLLUTANTS.
APTIC-25920 03

MOORE, JAMES C.
CHEMICAL SUPPRESSION OF NITROGEN OXIDES.
APTIC-25714 02

MOORE, NOEL EDWARD
DYNAMICS OF A GAS ABSORPTION COLUMN.
APTIC-24798 02

MOREKHINA, N. M.
CHEMICAL COMPOSITION OF FINELY-DISPERSED DUST FORMED DURING BLOWING OXYGEN THROUGH THE MELT IN THE HEARTH OF A STEEL FURNACE. 1ST COMMUNICATION.
APTIC-26018 02

MORGAN, GEORGE B.
FLUORIDE CONCENTRATIONS IN THE AMBIENT AIR.
APTIC-24736 04

MORIK, JOZSEF
BENZPYRENE CONTENT OF DUST SAMPLES COLLECTED ON URBAN AND RURAL SETTLEMENTS AND IN INDUSTRIAL PLANTS 3,4.
APTIC-25565 04

MORIWAKE, TADASHI
STUDIES ON AIR POLLUTION OF NEW DEVELOPING INDUSTRIAL CITY MIZUSHIMA, OKAYAMA PREFECTURE.
APTIC-26043 04

ON AIR POLLUTION OF MITSUISHI-TOWN, BIZEN-TOWN AND TAMANO-CITY, OKAYAMA PREFECTURE.
APTIC-26288 04

ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE. (II).
APTIC-26302 04

MORIWAKI, H.
AUTOMATED DESIGN OF STEEL-FRAME SUPPORTED CHIMNEYS.
APTIC-26015 14

MOROISHI, TAISHI
WATER PERMEABILITY OF RUST LAYER FORMED BY ATMOSPHERIC CORROSION.
APTIC-24671 09

MORRIS, MARY ANN
THE EFFECT OF AIR POLLUTANTS ON COTTON.
APTIC-24899 09

MORROW, PAUL E.
EXPERIMENTAL STUDIES OF INHALED MATERIALS. A BASIS FOR RESPIRATORY MODELS.
APTIC-25883 07

MORSE, KENNETH M.
PROBLEMS IN THE GRAVIMETRIC MEASUREMENT OF RESPIRABLE COAL MINE DUST.
APTIC-24656 03

MORSE, RICHARD S.
A SUGGESTED PROGRAM FOR GOVERNMENT AND INDUSTRY IN SOLVING THE AUTOMOTIVE EMISSIONS PROBLEM.
APTIC-25757 02

MOSTINSKII, I. L.
DEFLECTION OF A JET INJECTED INTO A STREAM.
APTIC-25942 05

MOTTARD, L.
FIRST OBSERVATIONS ABOUT ATMOSPHERIC ALLERGIC FUNGI IN SOUTHERN AND EASTERN BELGIUM.
APTIC-25876 04

MOTTERSHEAD, C. T.
COLLISION RATES BETWEEN GAS MOLECULES AND AEROSOL PARTICLES.
APTIC-26228 05

MOUSSALLI, F. S.
GAS FADING OF ACETATE AND TRIACETATE PRINTS.
APTIC-24781 09

MROSE, H.
DETERMINATION OF DUST FALL WITH GLASS FILTER PANS.
APTIC-24861 03

MUDD, J. B.
THE BIOSYNTHESIS OF STERYL GLUCOSIDES IN PLANTS.
APTIC-24661 08

MUELLER, PETER K.
PERFORMANCE OF A CONTINUOUS COLORIMETRIC AIR MONITOR.
APTIC-24728 03

TOXICOLOGICAL ASPECTS OF ATMOSPHERIC NITROGEN OXIDES.
APTIC-26271 07

MUELLER, THOMAS THEODOR
HYGIENIC STUDIES OF THE ATMOSPHERE IN SETTLEMENTS OF THE ZURICH REGION.
APTIC-26081 04

MUELLER, THOMAS M.
THE CALIFORNIA TEST. FIGHT AGAINST AIR POLLUTION BY MEANS OF CONTROL MEASURES APPLICABLE TO NEW AUTOMOBILES IN THE U.S.A.
APTIC-24859 12

MUKHERJEE, S. K.
PILOT-PLANT INVESTIGATIONS OF THE DESULPHURISATION OF LIGHT DISTILLATES.
APTIC-25962 02

MULLIN, W. J.
A METHOD FOR THE ESTIMATION OF SULPHUR TRIOXIDE.
APTIC-25940 03

MULVIHILL, J. W.
NEW POTENTIAL ABSORBENTS FOR SULFUR OXIDES REMOVAL FROM FLUE GAS.
APTIC-24932 02

MUNIDASA, M.
STUDIES ON THE REMOVAL OF SULFUR DIOXIDE FROM HOT FLUE GASES AS A MEASURE TO PREVENT AIR POLLUTION IV. RECOVERY OF FLUE GAS SULFUR AS AMMONIUM PHOSPHATE.
APTIC-24844 02

MUNN, R. E.
AIR POLLUTION LEVELS ASSOCIATED WITH A 49-HR INVERSION AT DETROIT-WINDSOR.
APTIC-25788 04

MURAKI, RYOJI
A NOVEL PROCESS FOR NEUTRALIZING AN ALKALINE WASTE WATER AND FOR DESULFURIZING SMOKE.
APTIC-24645 02

MURATA, TOKUJI
HOSPITAL INFECTION.
APTIC-25890 01

MURAYAMA, HISAKO
FINDINGS OF PFR ON SO2 HIGH SENSITIVE SCHOOL CHILDREN.
APTIC-25760 07

EFFECTS ON RAT OF CHRONIC EXPOSURE OF LOW CONCENTRATION OF CO. PART I.
APTIC-26113 07

MURAYAMA, H.
THE EFFECT OF PROLONGED EXPOSURE TO CARBON MONOXIDE ON HUMAN HEALTH.
APTIC-25810 07

MURRMANN, R. P.
FEASIBILITY OF TUNNEL DETECTION BY TRACE GAS ANALYSIS.
APTIC-24577 03

MUSHA, SOICHIRO
RAPID ANALYSIS OF LEAD IN AUTOMOBILE EXHAUST GAS.
APTIC-24618 03

APTIC-24618 03

MUSHA, SOICHRO
ALTERNATING CURRENT POLAROGRAPHIC ANALYSIS OF LEAD IN AUTOMOBILE EXHAUST GAS.
APTIC-24617 03

MUSKIE, EDMUND S.
ROLE OF THE FEDERAL GOVERNMENT IN AIR POLLUTION CONTROL.
APTIC-25595 12

MUZIO, L.
OXIDES OF NITROGEN IN THE COMBUSTION PRODUCTS OF AN AMMONIA FUELED RECIPROCATING ENGINE.
APTIC-25025 01

MYERS, J. G.
NEW POTENTIAL ABSORBENTS FOR SULFUR OXIDES REMOVAL FROM FLUE GAS.
APTIC-24932 02

MYERS, P. S.
THE REACTION OF ETHANE IN SPARK IGNITION ENGINE EXHAUST GAS.
APTIC-24747 01

THE DISAPPEARANCE OF ETHYLENE, PROPYLENE, N-BUTANE, AND 1-BUTANE IN SPARK-IGNITION ENGINE EXHAUST.
APTIC-24748 01

MYLES, W. J.
GAS FADING OF ACETATE AND TRIACETATE PRINTS.
APTIC-24781 09

ADVANCES IN THEORETICAL AND PRACTICAL STUDIES OF GAS FADING.
APTIC-24965 09

NAGAMI, T.
PROBLEMS ON MEASUREMENT OF THE CONCENTRATION OF PARTICULATE CONTAMINANTS IN SMOKE DUST.
APTIC-26020 03

NAGAMOTO, C. T.
PARTICLE TRAJECTORIES AND CAPTURE OF PARTICLES BY A SPHERE.
APTIC-25827 06

NAGAYAMA, TOKURO
RELATIONSHIP BETWEEN AIR POLLUTION AND ASTHMATIC DISEASES AMONG PRIMARY SCHOOL CHILDREN IN KITA-KYUSHU. PART I. STATISTICAL ANALYSIS BASED ON QUESTIONNAIRES.
APTIC-25739 07

NAGEL, REINHARD
AN ABSORPTION APPARATUS FOR GAS ANALYSIS.
APTIC-24651 03

NAKADOI, TAKASHI
SIMULATION OF PHOTOCHEMICAL REACTION IN POLLUTED AIR.
APTIC-25887 05

NAKADOI, T.
CONTINUOUS MEASUREMENT OF LOW GRADE HYDROCARBONS IN URBAN ATMOSPHERE.
APTIC-26109 03

NAKAGAWA, TORU
THE EXHAUST EMISSION CONTROL SYSTEM FOR ROTARY ENGINES.
APTIC-26008 02

NAKAJIMA, HIDEHIKO
PREVALENCE OF RESPIRATORY SYMPTOMS AND PEAK FLOW RATE OF THREE YEAR OLD CHILDREN.
APTIC-26089 07

NAKAMOTO, C.
STUDIES ON THE REMOVAL OF SULFUR DIOXIDE FROM HOT FLUE GASES AS A MEASURE TO PREVENT AIR POLLUTION IV. RECOVERY OF FLUE GAS SULFUR AS AMMONIUM PHOSPHATE.
APTIC-24844 02

NAKAMOTO, YOSHIE
ABSORPTION OF SO2 GAS BY VARIOUS SOLVENTS.
APTIC-24735 02

NAKAO, KUNITARO
REPORT ON AIR POLLUTION STUDY (NO. 4).
APTIC-26027 04

NAKAYA, S.
METHOD OF ELIMINATING SULFUR COMPOUNDS FROM OIL WITH THE USE OF MICROBES.
APTIC-24641 02

APTIC-24641 02

MICROBIAL REMOVAL OF SULFIDE CONTAINED IN PETROLEUM.
APTIC-25101 02

NAKAZAWA, AKIRA
ON HYDROGEN FLUORIDE AIR POLLUTION MONITORING DEVICE.
APTIC-26121 03

NAKAZONO, T.
REMOVAL OF SO2 GAS.
APTIC-25742 02

NASH, T.
LOW-VELOCITY GAS-LIQUID IMPINGER FOR THE CONTINUOUS ESTIMATION OF SULPHUR DIOXIDE AND OTHER ATMOSPHERIC POLLUTANTS.
APTIC-25851 03

A 'PERSONAL' MEASURING INSTRUMENT FOR ATMOSPHERIC SULPHUR DIOXIDE.
APTIC-26257 03

NAVARA, J.
SOME DATA ON THE WATER BALANCE IN PLANTS IN THE PRESENCE OF FLUOR IN THE SUBSTRATE.
APTIC-24787 08

NEAL, JACK
STOMACH CANCER AND AIR POLLUTION AN EXPERIMENTAL STUDY IN A PETROCHEMICAL AREA.
APTIC-26250 07

NEHLS, GERALD J.
THE NATIONAL AEROMETRIC DATA BANK.
APTIC-24121 04

NEIBURGER, M.
METEOROLOGICAL ASPECTS OF AIR POLLUTION AND SIMULATION MODELS OF DIFFUSION, TRANSPORT AND REACTIONS OF AIR POLLUTION TASK FORCE ASSESSMENT.
APTIC-26222 05

NELSON, C. J.
REGRESSION USING 'HOCKEY STICK' FUNCTION.
APTIC-25625 07

NELSON, EDWIN E.
HYDROCARBON CONTROL FOR LOS ANGELES BY REDUCING GASOLINE VOLATILITY.
APTIC-26199 02

NELSON, NORTON
BIOLOGICAL ASPECTS OF AIR POLLUTION.
APTIC-25775 07

NEMECEK, RADIM
MECHANISM OF TOXIC VAPOUR UPTAKE BY LUNG. I. EXPERIMENTAL APPARATURE RECORDING ORGANIC VAPOUR CONCENTRATIONS IN EXPIRED AIR.
APTIC-24668 07

NENCETTI, G. F.
PRODUCTION OF CARBON DISULFIDE FROM METHANE AND SULFUR DIOXIDE.
APTIC-24596 06

NESTI JR, ANTHONY J.
THE CONDENSATION NUCLEI COUNTER AS AN AIR POLLUTION WEAPON.
APTIC-24634 03

NEWALL, H. E.
AMMONIA PROCESS FOR REMOVAL OF SULFUR DIOXIDE FROM FLUE GAS.
APTIC-24763 02

NEWELL, REGINALD E.
THE GLOBAL CIRCULATION OF ATMOSPHERIC POLLUTANTS.
APTIC-25907 05

NEWILL, VAUN A.
HEALTH EFFECTS RESEARCH PROGRAM OF THE NATIONAL AIR POLLUTION CONTROL ADMINISTRATION.
APTIC-26213 12

NEWTON, DAVID F.
ROLE OF THE DAIRY AND FOOD INDUSTRY IN ENVIRONMENTAL POLLUTION CONTROL.
APTIC-26277 01

NEY, E. P.
AUTHOR'S REPLY TO THE PRECEDING DISCUSSION.
APTIC-24774 05

NICKOLA, P. W.
ATMOSPHERIC PHYSICS. ATMOSPHERIC DIFFUSION, DEPOSITION, AND TRANSPORT. (ANNUAL REPORT).
APTIC-24962 05

NIELSEN, HAROLD M.
THE EFFECT OF FLUORINE ON DAIRY CATTLE. V. FLUORINE IN THE URINE AS AN ESTIMATOR OF FLUORINE INTAKE.
APTIC-25735 08

NIKOLAEVSKIY, V. S.
SOME PECULIARITIES OF THE SUSCEPTIBILITY OF SCOTCH PINE TO SULFUR DIOXIDE INJURY.
APTIC-24853 08

NIKOLAYEV, A. M.
INVESTIGATION OF THE PROCESSES OF MASS EXCHANGE AND CHEMOSORPTION IN ROTATION-TYPE EQUIPMENT.
APTIC-24769 02

NIBEKO, P.
ABOUT SULFUR DIOXIDE AND DIMETHYLANILINE.
APTIC-26091 06

NISHIDA, KONOSUKE
AN ANALYSIS OF THE DRIVING PATTERN IN THE METROPOLITAN AREA. PART II.
APTIC-25725 01

AN ANALYSIS OF THE DRIVING PATTERN IN METROPOLITAN AREA. PART I.
APTIC-25726 01

A TENTATIVE PLAN CONCERNING A COMPREHENSIVE ASSESSMENT OF ENVIRONMENTAL POLLUTION.
APTIC-26304 04

NISHIDA, F.
THE REMOVALS FOR THE STINKING COMPOUNDS BY SPRAYING THE DEODORANT SOLUTIONS. (1).
APTIC-26056 02

NISHIMOTO, K.
DISPOSAL METHOD OF SULFUR OXIDE (SO2, SO3)-CONTAINING GAS.
APTIC-26105 02

NIVIN, P. I.
CARBON DISULFIDE--HYDROGEN SULFIDE BALANCE IN THE PRODUCTION OF VISCOSE TEXTILE FIBERS.
APTIC-25791 02

NOBLE, WILFRED
INVESTIGATION ON INJURY TO PLANTS FROM AIR POLLUTION IN THE LOS ANGELES AREA.
APTIC-26146 08

NOJIMA, S.
GASIFICATION PROCESS USING ASPHALT AS RAW MATERIAL.
APTIC-26011 02

NOLTE, D.
BODYPLETHYSMOGRAPHY.
APTIC-24739 07

NOMOTO, S.
A STATISITICAL STUDY ON VISIBILITY FORECASTING (PART I).
APTIC-22403 05

NOMURA, S.
REQUESTS AND OPINIONS CONCERNING THE ADMINISTRATION OF THE ENVIRONMENTAL STANDARD FOR SULFUR OXIDES.
APTIC-26111 12

NORRIE, D. H.
LNG PIPELINES - A STATUS SURVEY.
APTIC-25697 02

NORSETH, H. G.
THE DYNAMIC DILUTION OF AEROSOLS BY MIXING WITH CLEAN AIR.
APTIC-25778 02

NORTHROP, J.
THE EXCESS FUEL CONSUMED BY CARS WHEN STARTING FROM COLD.
APTIC-24605 01

OBERHOLTZER, JAMES E.
STUDY OF LONG-TERM ATMOSPHERIC TRACE CONTAMINANT MONITORING AND CONTROL. (FINAL REPORT).
APTIC-25686 03

OBERTHUER, W.
DUST FALL IN THE VICINITY OF CEMENT FACTORIES AS IT RELATES TO POSSIBLE HEALTH HAZARDS PART 2.
APTIC-24708 07

ODGERS, J.
AIR POLLUTION BY GAS TURBINES -- IS CONTROL POSSIBLE
APTIC-24631 02

OGLE, H. H.
PARTICLE COUNTING TECHNIQUES AVAILABLE FOR AEROSOL RESEARCH.
APTIC-24873 03

ONIBA, TOSHIO
SOME EXAMPLES OF WIDE-AREA AIR POLLUTION IN LATE SPRING.
APTIC-24685 04

OHTAKE, TAKESHI
ELECTRIC PROPERTIES OF ICE FOG CRYSTALS.
APTIC-24663 05

OKADA, HIROKATSU
ON THE AIR POLLUTION BY RED OCHRE FACTORIES IN MITSU-CHO. OKAYAMA PREFECTURE, JAPAN.
APTIC-26029 04

ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE (I).
APTIC-26045 04

ON THE TYPE OF AIR POLLUTION OF MIZUSHIMA, OKAYAMA PREFECTURE.
APTIC-26282 04

OKAMURA, KATSURO
STUDY ON THE WET-TYPE COLLECTOR USED ON THE PROCESS FOR THE PRODUCTION OF SLAKED LIME.
APTIC-26072 02

OKATSUKA, HISASHI
TOSHIBA ELECTROSTATIC AIR FILTER.
APTIC-26296 02

OKAZAKI, T.
REMOVAL OF ODOR OF ORGANIC SOLVENT AND UTILIZATION OF RECOVERED HEAT BY U.O.P. CATALYTIC COMBUSTION SYSTEM.
APTIC-26308 02

OKITA, TOSHIICHI
CHEMISTRY OF SMELL.
APTIC-24814 03

OKI, IWASHIRO
GAMMA RAY SPECTROMETRY OF THE NATURAL RADIOACTIVITY IN THE AIRBORNE DUST.
APTIC-25758 04

OKUNEV, A. I.
THERMODYNAMIC ANALYSIS OF THE REDUCTION OF SULFUR DIOXIDE BY METAL SULFIDES WITH THE FORMATION OF ELEMENTAL SULFUR.
APTIC-24703 06

OLENIACZ, WLADYSLAWA
EXTENSIVE PULMONARY CHANGES IN AN APPARENTLY LIGHT NITROGEN OXIDES POISONING.
APTIC-25767 07

OLSON, DIANE
PREDICTING HUMAN PERFORMANCE IN SPACE ENVIRONMENTS.
APTIC-12612 07

OLSSON, STEN
MEASURING METHODS FOR THE QUANTITATIVE MEASUREMENT OF SOLID PARTICLES IN FLUE GASES.
APTIC-24579 03

ONGUN, ALPASLAN
THE BIOSYNTHESIS OF STERYL GLUCOSIDES IN PLANTS.
APTIC-24661 08

ONO, AKIZO
ADSORPTION DESULFURIZATION METHOD FOR GASEOUS SUBSTANCES CONTAINING HYDROGEN SULFIDE.
APTIC-24818 02

ONO, YO
EFFECT OF AIR POLLUTION ON THE INHABITANTS IN OMUTA WITH SPECIAL REFERENCE TO THE FINDINGS OF LUNG FUNCTION AND CHEST X-RAY FILM.
APTIC-26024 07

OSBORNE, A. D.
ON THE STABILITY OF ACROLEIN TOWARDS PHOTO-OXIDATION IN THE NEAR ULTRAVIOLET.
APTIC-25630 05

OSE, YOUKI
STUDIES ON PUBLIC NUISANCE CAUSED BY AIR POLLUTION. 2. AIR POLLUTION IN TAJIMI CITY.
APTIC-26289 04

OSHIMA, HIDEHIKO
SOME OBSERVATIONS ON ANIMALS EXPOSED TO AIR POLLUTANTS ESPECIALLY SULPHUR OXIDES.
APTIC-26116 07

PRESENT STATE OF AIR POLLUTION IN YOKKAICHI AND VARIOUS MEDICAL PROBLEMS ABOUT IT.
APTIC-26305 07

OSTERHOUT, D. P.
AUTOMOTIVE STARTING AND WARM-UP RESPOND TO GASOLINE VOLATILITY.
APTIC-25931 01

OSTERLI, VICTOR P.
AIR POLLUTION CAUSED BY AGRICULTURE AND FORESTRY DUST.
APTIC-25976 02

AIR POLLUTION CAUSED BY AGRICULTURE AND FORESTRY ODOR.
APTIC-25977 02

AIR POLLUTION CAUSED BY AGRICULTURE AND FORESTRY PESTICIDES.
APTIC-26093 01

EFFECTS OF AIR POLLUTANTS ON AGRICULTURE AND FORESTRY PLANTS.
APTIC-26158 08

AIR POLLUTION CAUSED BY AGRICULTURE, FORESTRY AND THE FOREST PRODUCTS INDUSTRIES COMBUSTION.
APTIC-26255 02

OSUMI, K.
TREATMENT OF DUST GENERATED AT IRON MILL.
APTIC-26003 02

OTSUKA, KIYOSHI
THE DECAY MECHANISM OF TRIPLET SULFUR DIOXIDE MOLECULES FORMED BY INTERSYSTEM CROSSING IN THE FLASH PHOTOLYSIS OF SO2 (2400-3200 A).
APTIC-26154 06

OTT, WALTER
DEVICE FOR REDUCING THE CONTENT OF CARBON MONOXIDE IN THE EXHAUST GASES FROM AN INTERNAL COMBUSTION ENGINE.
APTIC-25737 02

OYAKE, T.
A NEW DEVICE FOR CONTINUOUS DETERMINATION OF SULFUR DIOXIDE.
APTIC-26120 03

OYAMA, YOSHISHIGO
THE EXHAUST EMISSION CONTROL SYSTEM FOR ROTARY ENGINES.
APTIC-26088 02

O'FALLON, JOHN E.
DEFICIENCIES IN THE AIR QUALITY ACT OF 1967.
APTIC-26196 12

O'HARRA, R. B.
MODERN AUTOMATIC BAGHOUSES FOR COLLECTION OF LEAD-FURNACE FUMES.
APTIC-25781 02

O'KEEFFE, ANDREW E.
AIR POLLUTION INSTRUMENTATION. STATE OF THE ART.
APTIC-12596 03

O'KEEFFE, A. E.
CHEMILUMINESCENT MEASUREMENT OF ATMOSPHERIC OZONE RESPONSE CHARACTERISTICS AND OPERATING VARIABLES.
APTIC-25653 03

PACKMAN, L. P.
TOXICITY OF OPEN AIR TO A VARIETY OF MICROORGANISMS.
APTIC-25698 08

PACK, J. L.
TABLES OF DRIFT VELOCITIES OF SLOW ELECTRONS IN HELIUM, NEON, ARGON, KRYPTON, XENON, HYDROGEN, DEUTERIUM, NITROGEN, CARBON MONOXIDE, CARBON DIOXIDE, WATER VAPOR, NITROUS OXIDE, AND AMMONIA.
APTIC-22681 06

PADY, S. M.
AECIOSPORE RELEASE IN GYMNOSPORANGIUM.
APTIC-26161 01

PAILLOUS, A.
REAL TIME SIMULATION OF ATMOSPHERIC BALLOON ENVIRONMENT.
APTIC-25823 05

PAIST, W. D.
ADVANCES IN THEORETICAL AND PRACTICAL STUDIES OF GAS FADING.
APTIC-24965 09

PALMBY, ALTON E.
FLAME PHOTOMETRIC DETERMINATION OF LEAD AND MANGANESE IN GASOLINE.
APTIC-24719 03

PALMER, R. K.
TURNAROUNDS, EQUIPMENT MAINTENANCE, AND BLOWDOWN SYSTEMS.
APTIC-24602 01

BLIND CHANGING.
APTIC-24721 01

PALM, EINAR W.
WHAT AIR POLLUTION DOES TO YOUR PLANTS.
APTIC-25865 08

PALUCH, ILGA R.
THEORETICAL COLLISION EFFICIENCIES OF CHARGED CLOUD DROPLETS.
APTIC-24662 05

PANTAGES, GUS
TEMPERATURE AS A FACTOR IN DETERMINING ORDER OF ELUTION IN GAS-LIQUID CHROMATOGRAPHY OF SOME C5-C8 HYDROCARBONS.
APTIC-24587 03

PAPYAN, G. S.
SIMULTANEOUS RECOVERY OF LOW-CONCENTRATION SULFUR OXIDES AND NITROGEN OXIDES WITH ALKALIES AND CARBONATES. IV. ABSORPTION WITH MAGNESIUM HYDROXIDE.
APTIC-24704 06

PARAMORE, JUNE
SULFUR EXTRACTION USING TRICHLOROETHYLENE IN PRESENCE OF LIMESTONE, TRONA, AND SODA ASH.
APTIC-25552 02

PARDOE, R. S.
GASSING....THE BUG-A-BOO OF THE BUS BUSINESS.
APTIC-25594 03

PARIENTE, R.
STUDY OF PULMONARY DUST DEPOSITS WITH ELECTRON MICROSCOPE AND MICROANALYSIS WITH AN ELECTRONIC PROBE.
APTIC-26110 07

PARKIN, R.
INTRATRACHEAL ADMINISTRATION OF DUST PARTICLES AND CARCINOGENS IN RATS.
APTIC-26099 07

PARTANEN, TIMO
ESTIMATION OF THE ANNUAL AVERAGE OF PARTICLE FALL BY MONTHLY VALUES. TOTAL DUSTFALL AND DUSTFALL COMPONENTS.
APTIC-24738 03

PASCH, ROGER H.
DESIGN AND APPLICATION OF GREASE FILTERS.
APTIC-26186 02

PAUSCH, JOSEF
CLEANING OF DUST SEPARATING APPARATUS.
APTIC-25892 02

DEVICE FOR FILTERING SOLIDS FROM A GAS.
APTIC-25908 02

PAVLENKO, YU. P.
METHODS OF SAMPLING SUSPENDED DUST FOR MEASURING THE FREE SILICA CONTENT.
APTIC-26076 03

PAVLOV, L. N.
DEVELOPMENT OF MOLECULAR CONDENSATION NUCLEI AND CONDITIONS FOR ITS OBSERVATION.
APTIC-24764 06

PAYTON, EDMUND JAMES
IMPROVEMENTS IN OR RELATING TO DUST TRAPS FOR USE IN THE EXAMINATION OF DUST-LADEN GAS.
APTIC-25664 03

PEARLMAN, MARTIN E.
NITROGEN DIOXIDE AND LOWER RESPIRATORY ILLNESS.
APTIC-25946 07

PEISAKHOV, I. L.
THERMOCHEMICAL STRENGTH OF GLASS FIBER USED IN BAG FILTERS.
APTIC-24878 02

PEJACK, EDWIN RAY
HEAT TRANSFER AND OTHER EFFECTS OF AN ELECTRIC FIELD ON A PARALLEL FLOW HYDROCARBON DIFFUSION FLAME.
APTIC-24800 06

PEKAREVA, T. I.
PH VALUE OF AMMONIUM SULFITE-BISULFITE SOLUTIONS.
APTIC-24895 02

PEMBROOK, JOHN D.
INVESTIGATION OF THE ABSORPTION OF INFRARED RADIATION BY ATMOSPHERIC GASES.
APTIC-25853 06

PENNER, P. E.
TIME CONSTANT OF A THOMAS AUTOMETER AND SIGNIFICANCE OF INDICATED RESPONSE.
APTIC-25777 03

PERKINS, NORMAN M.
POSSIBLE ASSOCIATION OF MOTOR VEHICLE ACCIDENTS WITH POLLUTANT LEVELS IN LOS ANGELES.
APTIC-26247 07

PERMUTT, S.
PLEURAL SURFACE PRESSURE IN DOGS.
APTIC-24664 07

PERRINE, RICHARD L.
POWER AND INDUSTRY CONTROL OF NITROGEN OXIDE EMISSIONS.
APTIC-26226 02

POWER AND INDUSTRY CONTROL OF SULFUR DIOXIDE EMISSIONS.
APTIC-26230 02

POWER AND INDUSTRY HYDROCARBONS AND OTHER ORGANIC SPECIES.
APTIC-26231 02

POWER AND INDUSTRY CONTROL OF CARBON MONOXIDE EMISSIONS.
APTIC-26232 02

POWER AND INDUSTRY PARTICULATES.
APTIC-26233 02

MISCELLANEOUS INDUSTRIAL EMISSIONS.
APTIC-26254 01

PERSONAL AUTHOR NOT RECORDED,
AIR POLLUTION TRANSLATIONS A BIBLIOGRAPHY WITH ABSTRACTS- VOLUME I.
APTIC-12493 14

GUIDELINES FOR THE DEVELOPMENT OF AIR QUALITY STANDARDS AND IMPLEMENTATION PLANS.
APTIC-12494 12

REFERENCE BOOK SUMMARY OF NATIONWIDE EMISSIONS.
APTIC-12496 01

REPORT FOR CONSULTATION ON THE METROPOLITAN PROVIDENCE INTERSTATE AIR QUALITY CONTROL REGION (RHODE ISLAND-MASSACHUSETTS).
APTIC-12569 12

SYSTEMS STUDY FOR CONTROL OF EMISSIONS. PRIMARY NONFERROUS SMELTING INDUSTRY. (FINAL REPORT). VOLUME II APPENDICES A AND B.
APTIC-12751 02

SYSTEMS STUDY FOR CONTROL OF EMISSIONS. PRIMARY NONFERROUS SMELTING INDUSTRY. (FINAL REPORT). VOLUME III APPENDICES C THROUGH G.
APTIC-12777 02

SYSTEMS STUDY FOR CONTROL OF EMISSIONS. PRIMARY NONFERROUS SMELTING INDUSTRY. (FINAL REPORT). VOL I.
APTIC-12823 02

ANNOTATED BIBLIOGRAPHY OF LITERATURE ON BERYLLIUM.
APTIC-12829 07

INTERSTATE EFFECTS SURVEILLANCE NETWORK. 1969 DATA.
APTIC-22703 04

APPLICATIONS OF AEROSPACE TECHNOLOGY IN AIR POLLUTION CONTROL.

APTIC-23066 12

FLUORINE GASES IN ATMOSPHERE AS INDUSTRIAL WASTE BLAMED FOR DEATH AND CHRONIC POISONING OF DONORA AND WEBSTER, PA., INHABITANTS.
APTIC-24580 07

AIRCRAFT GAS TURBINE ENGINE EXHAUST SMOKE MEASUREMENT.
APTIC-24581 03

PROCESS FOR RECOVERING ELEMENTAL SULFUR FROM GASES CONTAINING SULFUR DIOXIDE.
APTIC-24599 02

METHOD FOR THE SEPARATION OF PYRITE FROM COAL.
APTIC-24609 02

INVESTIGATIONS ON THE REDUCTION OF THE SULFUR CONTENT OF COKE DURING CARBONIZATION.
APTIC-24610 02

THE 1968 ANNUAL REPORT OF THE STATE INSTITUTE FOR IMMISSION AND SOIL PROTECTION OF THE STATE OF NORDRHEIN-WESTFALEN IN ESSEN.
APTIC-24612 12

FUNDING FOR 1968 PUBLIC NUISANCE INVESTIGATION RESEARCH PATHOLOGICAL-CHEMICAL RESEARCH OF THE HUMAN LUNG POLLUTION BY AIR POLLUTION.
APTIC-24616 07

EVAPORATIVE EMISSIONS CONTROLS IMPROVED IN '71 MODELS.
APTIC-24625 02

WASTE GYPSUM INTO USEFUL PRODUCTS.
APTIC-24646 02

MARKET SITUATION OF POLLUTION CONTROL EQUIPMENT.
APTIC-24650 10

'AUTOMOTIVE' IS THE DIRTY WORD IN SMOKE EMISSION RS.
APTIC-24677 11

INITIATIVE FOR WATER AND AIR POLLUTION CONTROL.
APTIC-24683 02

LEAD IN EXHAUST GASES.
APTIC-24757 04

NATIONAL SURVEY OF THE ODOR PROBLEM. PHASE I OF A STUDY OF THE SOCIAL AND ECONOMIC IMPACT OF ODORS APPENDIX.
APTIC-24768 13

PROCEDURE FOR RECOVERING ELEMENTAL SULFUR FROM SULFUROUS GASES.
APTIC-24777 02

PROCEDURE FOR EXTRACTING AND CONCENTRATING SULFUROUS GASES.
APTIC-24778 02

IMPROVEMENT IN THE PROCESS OF PURIFYING FUMES AND GASES.
APTIC-24785 02

AIR POLLUTION IN KAWASAKI.
APTIC-24789 04

PLANT SERVICES BEAT EXPLOSION HAZARDS.
APTIC-24810 02

TURBINE-POWERED BUSES. HOW GAS TURBINES WORK.
APTIC-24811 02

PROBLEMS SET BY ATMOSPHERIC POLLUTION IN JAPAN.
APTIC-24826 01

COSTS OF CONTROLLING GRAY IRON CUPOLA EMISSIONS.
APTIC-24827 10

LEADED OR NON-LEADED GASOLINE...WHAT ARE THE FACTS
APTIC-24829 02

OIL'S U. S. ANITPOLLUTION OUTLAY SURGING.
APTIC-24841 02

A SUMMARY OF FEDERAL, STATE AND LOCAL AIR POLLUTION LAWS.
APTIC-24855 12

RECOMMENDATIONS AND SUMMARY OF PARKERSBURG, W. VA.-MARIETTA, OHIO, INTERSTATE AIR POLLUTION ABATEMENT CONFERENCE.
APTIC-24858 12

LEAD AND AIR POLLUTION AN ANALYSIS OF THE MORSE REPORT.
APTIC-24877 01

ENGINEERING OUTLINE 94 DUST COLLECTION.
APTIC-24891 02

METHOD FOR CONVERTING HYDROGEN SULFIDE TO OBTAIN SULFUR.
APTIC-24908 02

SUMMARIES OF LITERATURE RELATED TO AIR POLLUTION.
APTIC-24918 07

COMBUSTION POWER UNIT -- 400 CPU-400.
APTIC-24954 02

ANOTHER NEW ENGINE NUDGES DETROIT.
APTIC-24968 02

APPARATUS FOR REDUCING HYDROCARBON CONTENT OF ENGINE EXHAUST GASES DURING DECELERATION OF AUTOMOBILE.
APTIC-25540 02

INDUSTRY, ENVIRONMENT AND ENVIRONMENTAL PROTECTION.
APTIC-25541 12

AIR POLLUTION CONTROL. ACTIVE RESEARCH GRANTS FOR FISCAL YEAR 1969.
APTIC-25583 12

IMPROVEMENTS IN OR RELATING TO DEVICES FOR CLEANING EXHAUST GASES.
APTIC-25599 02

APPARATUS FOR EFFECTING INTIMATE CONTACT BETWEEN A GAS AND A LIQUID.
APTIC-25600 02

EQUILIBRATION AND STEAM-REFORMING CATALYSTS.
APTIC-25601 02

METHOD AND APPARATUS FOR MINIMIZING AIR POLLUTION.
APTIC-25602 02

APPARATUS FOR PURIFYING FLUE GASES.
APTIC-25603 02

AIR POLLUTION.
APTIC-25610 12

AESTHETIC DIESEL SMOKE LEVELS IN BOTH ACCELERATION AND LUG DOWN ARE SET TO BEGIN IN JANUARY 1970.
APTIC-25619 11

FLUORIDE FOILERS.
APTIC-25631 03

PROTECTION AGAINST IMMISSION.
APTIC-25638 02

PROCESS FOR MANUFACTURING SULFUR FROM SULFUR OXIDES, USING CARBON MONOXIDE.
APTIC-25649 02

CONVERSION OF SULFUR DIOXIDE TO SULFUR TRIOXIDE.
APTIC-25651 02

METHOD FOR THE REMOVAL OF FLUORINE FROM INDUSTRIAL GASES.
APTIC-25658 02

DETECTIONS OF ALCOHOLS IN GAS ATMOSPHERES.
APTIC-25666 03

SPECTROPHOTOMETRIC DETERMINATION OF FLUORIDE ION.
APTIC-25668 03

SOLUBILITY OF SULPHUR DIOXIDE IN SATURATED MAGNESIUM BISULPHITE SOLUTION TAPPI DATA SHEET 164 SOLUBILITY OF SULPHUR DIOXIDE IN SATURATED MAGNESIUM BISULPHITE SOLUTION TAPPI DATA SHEET 165 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 5 C TAPPI DATA SHEET 166 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 15 C TAPPI DATA SHEET 167 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 25 C TAPPI DATA SHEET 168 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 35 C TAPPI DATA SHEET 169 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 50 C TAPPI DATA SHEET 170 SOLUBILITY OF SULPHUR DIOXIDE IN MAGNESIUM BISULPHITE SOLUTION AT 60 C TAPPI DATA SHEET 171.
APTIC-25672 06

RECOMMENDED GUIDE FOR THE PREDICTION OF THE DISPERSION OF AIRBORNE EFFLUENTS.
APTIC-25682 05

AIR POLLUTION PROBLEMS IN THE WOOD PRODUCTS INDUSTRY.
APTIC-25683 01

A STUDY OF THE POSSIBLE MOVEMENT OF MICROORGANISMS THROUGH SMALL ORIFICES. (FINAL REPORT).
APTIC-25687 06

PROPOSED IMPLEMENTATION PLAN FOR THE CONTROL OF PARTICULATES AND SULFUR OXIDES FOR THE STATE OF OHIO PORTION OF THE METROPOLITAN CINCINNATI INTERSTATE AIR QUALITY CONTROL REGION.
APTIC-25688 12

TWO SPEECHES MADE BY MONSIEUR GEORGES POMPIDOU PRESIDENT OF THE FRENCH REPUBLIC.
APTIC-25730 13

THE HUNDRED MEASURES.
APTIC-25731 12

DAMAGE CAUSED DUE TO FOUNDRY SMOKE.
APTIC-25750 08

SULFUR DIOXIDE.
APTIC-25751 07

APTIC-25761 06

PARKERSBURG, WEST VIRGINIA--MARIETTA, OHIO, AIR POLLUTION ABATEMENT ACTIVITY SUPPLEMENTAL TECHNICAL REPORT.
APTIC-25780 04

ACTIVITIES RELATED TO THE NON-MINING INDUSTRIES.
APTIC-25794 02

CONTINUOUS AIR MONITORING PROJECTS 1968 DATA TABULATIONS

AND SUMMARIES, CHICAGO.
APTIC-25803 04

CONTINUOUS AIR MONITORING PROJECTS 1968 DATA TABULATIONS AND SUMMARIES, PHILADELPHIA.
APTIC-25804 04

CONTINUOUS AIR MONITORING PROJECTS 1967 DATA TABULATIONS AND SUMMARIES, DENVER.
APTIC-25805 04

CONTINUOUS AIR MONITORING PROJECTS 1968 DATA TABULATIONS AND SUMMARIES, CINCINNATI.
APTIC-25817 04

CONTINUOUS AIR MONITORING PROJECTS 1968 DATA TABULATIONS AND SUMMARIES, WASHINGTON, D. C.
APTIC-25818 04

COAL CLEANING PLANT PROTOTYPE SPECIFICATIONS A REPORT TO PROCESS CONTROL ENGINEERING DIVISION NATIONAL AIR POLLUTION CONTROL ADMINISTRATION.
APTIC-25820 02

ATMOSPHERIC REACTION STUDIES IN THE LOS ANGELES BASIN. VOLUME I. PROGRAM DESIGN AND METHODOLOGY DATA SUMMARY AND DISCUSSION. 1969. (FINAL REPORT).
APTIC-25837 06

METHOD AND DEVICE FOR THE DESULFURISATION OF GASES, ESPECIALLY FLUE GASES AND OTHER WASTE GASES.
APTIC-25838 02

INTRODUCTION AND SUMMARY.
APTIC-25840 07

ATMOSPHERIC REACTION STUDIES IN THE LOS ANGELES BASIN. VOLUME II. COMMERCE GROUND DATA. 1969. (FINAL REPORT).
APTIC-25856 04

ATMOSPHERIC REACTION STUDIES IN THE LOS ANGELES BASIN. VOLUME III. EL MONTE GROUND DATA. 1969. (FINAL REPORT)
APTIC-25857 04

EXAMPLES OF CITY-GAS COMBUSTION IN BOILERS.
APTIC-25868 02

THE STUDY OF MAINTENANCE OF AIR-CLEANING DEVICES AS AIR POLLUTION CONTROL MEASURE.
APTIC-25880 02

AIR POLLUTION TRANSLATIONS A BIBLIOGRAPHY WITH ABSTRACTS - VOLUME 2.
APTIC-25930 14

INORGANIC FLUORIDES.
APTIC-25933 11

METHOD OF MANUFACTURING SULFUR FROM GASES CONTAINING SULFUR DIOXIDE.
APTIC-25973 02

CONTINUOUS AIR MONITORING PROJECTS 1968 DATA TABULATIONS AND SUMMARIES, ST. LOUIS.
APTIC-25992 04

ECONOMIC PROJECTIONS FOR AIR QUALITY CONTROL REGIONS.
APTIC-25993 10

ATMOSPHERIC REACTION STUDIES IN THE LOS ANGELES BASIN. (FINAL REPORT).
APTIC-25994 04

KANAWHA VALLEY AIR POLLUTION STUDY.
APTIC-25996 04

PROPOSED IMPLEMENTATION PLAN FOR THE CONTROL OF PARTICULATES AND SULFUR OXIDES FOR THE STATE OF INDIANA PORTION OF THE METROPOLITAN CINCINNATI INTERSTATE AIR QUALITY CONTROL REGION.
APTIC-25998 12

STATE OF THE ART.
APTIC-26000 07

ADJUST SPARK ADVANCE TO CONTROL NOX.
APTIC-26017 02

SEMINAR ON 'REMOVAL OF GASES AND DUSTS FROM VENTILATING AIR AND INDUSTRIAL EMISSIONS'.
APTIC-26023 02

THE INFLUENCE OF AIR POLLUTION ON RESPIRATORY APPARATUS OF THE INHABITANTS OF BOTH OTAKE AND KURE CITIES.
APTIC-26025 07

REPORT ON AIR POLLUTION STUDY, NAOETSU REGION.
APTIC-26026 04

RESEARCH ON THE ACTUAL CONDITION OF AIR POLLUTION. 3. DEGREE OF AIR POLLUTION IN KANAGAWA PREFECTURE. (MEASURED BY ALKALINE PAPER FILTRATION METHODS).
APTIC-26030 04

REPORT ON THE STUDY OF AIR POLLUTION IN NISHIYODOGAWA WARD.
APTIC-26031 04

THE INFLUENCE OF AIR POLLUTION. 3.1. THE INFLUENCE OF AIR POLLUTION ON TREES. 2. THE CHARACTERISTICS OF INSOLUBLE SUBSTANCES ADHERED TO THE LEAVES OF ROADSIDE TREES.
APTIC-26035 08

AUTOMOTIVE ENGINE DESIGNING AND GASOLINE.
APTIC-26038 01

AN OUTLINE OF THE RESULTS OF AIR POLLUTION MEASUREMENTS IN THREE PLACES IN TOKYO.
APTIC-26042 04

THE INVESTIGATION OF THE ACTUAL CONDITION OF AIR POLLUTION. 1.1 AIR POLLUTION IN THE KEIHIN INDUSTRIAL DISTRICTS.
APTIC-26044 04

DEGREE OF AIR POLLUTION IN KANAGAWA PREFECTURE.
APTIC-26052 04

REPORT OF THE SURVEY OF AIR POLLUTION OF ANNAKA AREA IN GUNMA PREFECTURE.
APTIC-26054 04

CONGRESS MAKES FURTHER PROGRESS ON ANTIPOLLUTION LEGISLATION.
APTIC-26068 12

AIR POLLUTION.
APTIC-26071 02

SIMULTANEOUS SO2 AND FLY ASH REMOVAL.
APTIC-26073 02

EFFECT OF AIR POLLUTION ON TREES. 3. ANALYSIS AND FRACTIONATION OF SULFUR IN THE LEAVES OF STREET TREES.
APTIC-26078 08

PROSPECTS FOR ELECTRIC VEHICLES. A STUDY OF LOW-POLLUTION-POTENTIAL VEHICLES--ELECTRIC.
APTIC-26083 02

NEW CUMBERLAND, WEST VIRGINIA -- KNOX TOWNSHIP, OHIO -- AIR POLLUTION ABATEMENT ACTIVITY.
APTIC-26087 04

AIR POLLUTION SMOKE AND SO2.
APTIC-26094 04

STATE OF AFFAIRS AND PROBLEMS INVOLVING AUTOMOTIVE FUEL GASOLINE.
APTIC-26100 01

INTERMEDIATE REPORT OF STUDY ON AIR POLLUTION CAUSED BY AUTOMOBILE EXHAUST GAS.
APTIC-26102 05

SURVEY OF ACTUAL CONDITIONS OF AIR POLLUTION. 1. AIR POLLUTION IN KEIHIN INDUSTRIAL AREA (1).
APTIC-26130 04

LUCAS BACK THE ZINC-AIR BATTERY.
APTIC-26140 02

PREPARATION OF SULFUR BY THE INTERACTION OF SULFUR DIOXIDE CONTAINING GASES WITH HEATED CARBON IN THE PRESENCE OF METAL COMPOUNDS.
APTIC-26165 02

REPORT ON THE EPIDEMIOLOGICAL INVESTIGATION OF THE HEALTH EFFECTS OF AIR POLLUTION AND REPORT ON THE INVESTIGATION OF INFANT DEATHS IN THE YOKKAICHI DISTRICT.
APTIC-26169 07

EXPERT COMMITTEE REPORT ON THE STANDARDS FOR ENVIRONMENTAL POLLUTION DUE TO CARBON MONOXIDE.
APTIC-26170 07

MANUFACTURERS' REPORT OF AIR POLLUTION CONTROL EQUIPMENT SALES.
APTIC-26193 10

A BRIEF REVIEW OF FLUE GAS TREATMENT.
APTIC-26195 02

EFFECTS OF GASOLINE ADDITIVES ON CARBURETOR AND PCV SYSTEMS PERFORMANCE AS THEY RELATE TO EXHAUST EMISSIONS.
APTIC-26200 02

BESANCON.
APTIC-26225 13

METHOD FOR THE PRODUCTION OF ELEMENTARY SULFUR FROM GASES CONTAINING HYDROGEN SULFIDE.
APTIC-26238 02

METHOD FOR PROCESSING LYE OBTAINED FROM THE SCRUBBING WITH AMMONIA OF GASES CONTAINING SULFUR DIOXIDE AND POSSIBLY SULFUR TRIOXIDE.
APTIC-26240 02

PROCESS FOR REMOVING SULPHUR DIOXIDE FROM A GAS.
APTIC-26272 02

ENVIRONMENT IN YAMAGUCHI PREFECTURE.
APTIC-26281 04

THE HEALTH COSTS OF AIR POLLUTION.
APTIC-26285 07

'THE WEEK OF DRUG AND HEALTH' IN 1969. REPORT ON THE INVESTIGATION OF PUBLIC NUISANCE BY TRAFFIC IN BIG CITIES IN JAPAN.
APTIC-26286 04

RESEARCH ON THE ACTUAL CONDITION OF AIR POLLUTION. 4.

INVESTIGATION OF AIR POLLUTION CAUSED BY AUTOMOBILE WASTE GASES IN THE SEISHO NATIONAL HIGHWAY.
APTIC-26287 04

AIR POLLUTION.
APTIC-26290 04

APTIC-26293 04

PERFORMANCE TEST METHOD FOR VENTILATOR/AIR PURIFIER (FOR DELETERIOUS GAS), DRAFT.
APTIC-26295 02

ACTUAL REPORT OF INFLUENCE OF AIR POLLUTION ON THE BODIES.
APTIC-26306 07

AN INTERIM REPORT ON THE INVESTIGATION OF PUBLIC NUISANCE BY LEAD.
APTIC-26310 04

PERTIERRA, JOSE M.
THE THREAT POSED BY DUST AND INDUSTRIAL GASES EMITTED BY CENTRAL HEATING PLANTS AND OTHER AIR POLLUTION SOURCES.
APTIC-22246 07

PESEK, F.
BIOCHEMICAL PHENOMENA IN THE SOIL IN EXHALATION AREAS.
APTIC-25660 08

PESKIN, R. L.
A STUDY OF THE MECHANICS OF TURBULENT GAS-SOLID SHEAR FLOWS.
APTIC-25657 06

PETERSEN, WOLF-DIETER
A SCATTERED LIGHT PARTICLE-SIZE SPECTROMETER FOR SUBMICROSCOPIC AEROSOLS OF HIGH CONCENTRATION.
APTIC-25871 03

PETIT, J. M.
FIRST OBSERVATIONS ABOUT ATMOSPHERIC ALLERGIC FUNGI IN SOUTHERN AND EASTERN BELGIUM.
APTIC-25876 04

PETRIASHVILI, K. I.
THE POSSIBILITY OF DECREASING THE CARBON MONOXIDE CONTENT OF EXHAUST GASES FROM BENZENE ENGINES.
APTIC-24689 02

PETROCK, F. K.
SURFACE COLLECTION EFFICIENCY OF LARGE-PORE MEMBRANE FILTERS.
APTIC-22169 03

PETROV, I. P.
METHODS OF SAMPLING SUSPENDED DUST FOR MEASURING THE FREE SILICA CONTENT.
APTIC-26076 03

PETROW, HENRY G.
FABRICATION OF MONODISPERSE LUCITE AND IRON OXIDE PARTICLES WITH A SPINNING DISK GENERATOR.
APTIC-26251 07

PEVNYI, N. I.
COMPLEXOMETRIC DETERMINATION OF SULFUR TRIOXIDE AND SULFUR DIOXIDE IN WASTE PROCESS GASES.
APTIC-26067 03

PHELPS, A. V.
TABLES OF DRIFT VELOCITIES OF SLOW ELECTRONS IN HELIUM, NEON, ARGON, KRYPTON, XENON, HYDROGEN, DEUTERIUM, NITROGEN, CARBON MONOXIDE, CARBON DIOXIDE, WATER VAPOR, NITROUS OXIDE, AND AMMONIA.
APTIC-22681 06

PHELPS, B. A.
THE PRODUCTION OF TRANSPARENT PROFILES OF DUST PARTICLES AS AN AID TO AUTOMATIZED PARTICLE COUNTING.
APTIC-26183 03

PHILLIPS, LEONARD
TOXICITY OF OZONE. II. EFFECT OF OXYGEN AND CARBON DIOXIDE UPON ACUTE TOXICITY.
APTIC-26188 07

PHILLIPS, W. A.
SURFACE COLLECTION EFFICIENCY OF LARGE-PORE MEMBRANE FILTERS.
APTIC-22169 03

PHILLLIPS, B. B.
AN EXPERIMENTAL INVESTIGATION OF THE EFFECT OF AIR POLLUTION ON THE INITIATION OF RAIN.
APTIC-25639 05

PICH, J.
TEMPERATURE CHARACTERISTICS OF FIBRE FILTERS.
APTIC-25798 02

ANALYTICAL METHODS FOR DETERMINATION OF AEROSOLS WITH HELP OF MEMBRANE ULTRAFILTERS. VI. ON THE MECHANISM OF MEMBRANE ULTRAFILTER ACTION.
APTIC-25956 03

ANALYTICAL METHODS FOR DETERMINATION OF AEROSOLS BY MEANS OF MEMBRANE ULTRAFILTERS. VII. DIFFUSION AND IMPACTION PRECIPITATION OF AEROSOL PARTICLES BY MEMBRANE ULTRAFILTERS.
APTIC-26266 03

PIERRARD, J.
PARTICLE TRAJECTORIES AND CAPTURE OF PARTICLES BY A SPHERE.
APTIC-25827 06

PILLAY, K. K. SIVASANKARA
ACTIVATION ANALYSIS OF AIRBORNE SELENIUM AS A POSSIBLE INDICATOR OF ATMOSPHERIC SULFUR POLLUTANTS.
APTIC-26069 03

PITLICK, HARRIS
REMOVAL OF LEAD FROM AUTOMOBILE EXHAUSTS BY MOLTEN SALTS.
APTIC-26064 02

PITTS JR, JAMES N.
SINGLET MOLECULAR OXYGEN AND THE PHOTOCHEMISTRY OF URBAN ATMOSPHERES.
APTIC-24825 05

PITTS JR, J. N.
ON THE STABILITY OF ACROLEIN TOWARDS PHOTO-OXIDATION IN THE NEAR ULTRAVIOLET.
APTIC-25630 05

ALDEHYDES, POLYNUCLEAR AROMATIC HYDROCARBONS, AND ATMOSPHERIC LEAD.
APTIC-26269 02

PLANTS, K. D.
HERE'S WHAT SO2 REMOVAL COSTS.
APTIC-22444 10

POGREBNYAK, P. S.
THE EFFECT OF INDUSTRIAL GASES AND INDUSTRIAL SMOKE ON VARIOUS FOREST SPECIES.
APTIC-24866 08

POLGLASE, WILLIAM L.
THE CONTROL OF ORGANIC SOLVENTS.
APTIC-25592 01

POLLARD, JOHN R.
ACOUSTIC SOUNDING--A NEW APPROACH TO THE STUDY OF ATMOSPHERIC STRUCTURE.
APTIC-25622 03

POLSTER, G.
THE APPLICATION OF TURNER'S CLASSIFICIATION OF DIFFUSION CATEGORIES TO CENTRAL EUROPEAN CLIMATES.
APTIC-12792 05

POMERANTSEV, V. M.
OXIDATION OF SULFUR DIOXIDE ON A VANADIUM CATALYST.
APTIC-24623 06

POMERAT, C. M.
EFFECT OF AUTOMOBILE EXHAUST ON CELL GROWTH IN VITRO.
APTIC-25604 03

POOLER JR, FRANCIS
ST. LOUIS DISPERSION STUDY. VOLUME I. INSTRUMENTATION, PROCEDURES, AND DATA TABULATIONS.
APTIC-25997 05

POPIEL, WALTER G.
FORECASTING COH LEVELS AT SIX OUTLYING SAMPLING STATIONS IN ALLEGHENY COUNTY USING STATISTICAL CORRELATIONS DERIVED FROM THE DOWNTOWN STATION.
APTIC-26280 05

POPMA, D. C.
AN IMPROVED CONTAMINANT SENSING TECHNIQUE FOR LABORATORY AND SPACECRAFT APPLICATION.
APTIC-24959 03

POPPELE, E. W.
TWO-STAGE MIST ELIMINATORS FOR SULFURIC ACID PLANTS.
APTIC-24833 02

PORSCH, FRED W.
AIR POLLUTION CONTROL DEVICE FOR ENGINES.
APTIC-25566 02

PORTERFIELD, CHARLES W.
DUST COLLECTION AT ITMANN PREPARATION PLANT.
APTIC-24679 02

PORTER, F. E.
THE DYNAMIC BEHAVIOR OF AEROSOLS.
APTIC-25779 06

PORTER, STUART M.
METHOD AND APPARATUS FOR RECYCLING DRYER STACK GASES.
APTIC-25863 02

PORTER, WILLIAM C.
THE ROLE OF PRIVATE NUISANCE LAW IN THE CONTROL OF AIR POLLUTION.
APTIC-25596 12

PORUBSZKY, I.
THE ROLE OF THE SAMPLE HOLDER IN THE THERMAL INVESTIGATION OF PROCESSES ACCOMPANIED BY THE SPLITTING OFF OF CO.
APTIC-24653 06

POTTER, E. C.
FACTORS INFLUENCING THE EFFICIENT OPERATION OF ELECTROSTATIC PRECIPITATORS FOR PULVERISED-FUEL ASH.
APTIC-24630 02

POWELL, J.
THE WESTERN COAL DEPOSITS A NATIONAL SOURCE OF POWER.
APTIC-24955 01

POWER, GORDON G.
SOLUBILITY OF O2 AND CO IN BLOOD AND PULMONARY AND PLACENTAL TISSUE.
APTIC-24892 07

POZZANI, U. C.
THE TOXICOLOGICAL BASIS OF THRESHOLD LIMIT VALUES 5. THE EXPERIMENTAL INHALATION OF VAPOR MIXTURES BY RATS, WITH NOTES UPON THE RELATIONSHIP BETWEEN SINGLE DOSE INHALATION AND SINGLE DOSE ORAL DATA.
APTIC-26270 07

PRAGER, MANFRED
AEROSOL FORMATION FROM GASEOUS AIR POLLUTANTS.
APTIC-24921 05

PRATT, P.
A COOPERATIVE STUDY OF CERTAIN MEASUREMENTS OF EMPHYSEMA.
APTIC-24804 07

PRAUSNITZ, J. M.
ADSORPTION OF HYDROCARBONS ON GRAPHITIZED CARBON.
APTIC-25621 02

PRESCHER, KARL ERNST
DEPENDENCE OF SULFUR DIOXIDE ABSORPTION ON TEMPERATURE IN THE WEST-GAEKE METHOD.
APTIC-24652 03

PRIKHOZHENKO, A. E.
IMPROVING THE GAS CLEANING ON 100 T OXYGEN CONVERTERS.
APTIC-24809 02

PRINZ, BERNHARD
POSSIBILITY OF THE ANALYTICAL DETERMINATION OF DOSE-THRESHOLD VALUE RELATIONSHIPS.
APTIC-24832 07

PROCTOR, D. F.
PLEURAL SURFACE PRESSURE IN DOGS.
APTIC-24664 07

PROJAHN, FRITZ
PROCESS FOR OBTAINING ELEMENTAL SULFUR FROM THE WASTE GASES OF CARBON DISULFIDE MANUFACTURING.
APTIC-25650 02

PROSPERO, JOSEPH M.
DUST IN THE CARIBBEAN ATMOSPHERE TRACED TO AN AFRICAN DUST STORM.
APTIC-24632 05

PUKLINA, D. L.
PH VALUE OF AMMONIUM SULFITE-BISULFITE SOLUTIONS.
APTIC-24895 02

QUESNEL, GUY
OIL-FIRED AND COAL-FIRED 600-MW BOILER OF THE POWER PLANT AT LE HAVRE.
APTIC-25677 02

QUINO, ENRIQUE A.
FIELD METHOD FOR THE DETERMINATION OF INORGANIC LEAD FUMES IN AIR.
APTIC-25691 03

RABE, BLAINE
A STUDY OF THE DECAY PROCESSES IN THE TRIPLET SULFUR DIOXIDE MOLECULE EXCITED AT 3828.8 A.
APTIC-26152 06

RABE, PAUL
A COMPARISON OF METHODS FOR TESTING THE FASTNESS TO GAS FADING OF DYES ON ACETATE.
APTIC-26167 03

RADFORD, H. D.
NEW WAY TO DESULFURIZE RESIDS.
APTIC-24830 02

RADUSHKEVICH, L. V.
ON THE ROLE OF BROWNIAN VIBRATIONS OF ULTRATHIN FIBERS IN AEROSOL FILTRATION.
APTIC-24840 02

RALSTON, EDWARD LYNN
INSTALLATION FOR THE ABSORPTION OF SULFUR DIOXIDE.
APTIC-24750 02

RAMAUT, J. L.
FIRST OBSERVATIONS ABOUT ATMOSPHERIC ALLERGIC FUNGI IN SOUTHERN AND EASTERN BELGIUM.
APTIC-25876 04

RAMPSCH, J. W.
NASOPHARYNGEAL CARCINOMA AND ENVIRONMENTAL CARCINOGENS.
APTIC-24880 07

RANDHAWA, SARABJIT S.
SELECTIVE METHANATION OF CARBON MONOXIDE.
APTIC-25736 02

RANK, D. M.
CHANGES IN ROTATIONAL CONSTANTS IN SOME PI-SIGMA BANDS OF HCN AND H2O.
APTIC-25673 06

RASMUSSEN, RONALD E.
INTERACTION OF BENZO(A)PYRENE (BAP) WITH MAMMALIAN CELLS IN CULTURE.
APTIC-25850 07
IDENTIFICATION OF METABOLITES OF BENZO(A)PYRENE PRODUCED BY CELLS FROM HAMSTERS SUSCEPTIBLE TO CHEMICAL CARCINOGENESIS.
APTIC-25968 07

RASSON, D.
THE FORMATION OF CARBON DISULFIDE RESULTING FROM THE REACTION BETWEEN SULFUR DIOXIDE AND COAL.
APTIC-26155 02

RASSWEILER, GERALD M.
EFFECT OF TETRAETHYLLEAD ON PREFLAME REACTIONS IN AN ENGINE.
APTIC-24718 01

RATHGEBER, FERDINAND
ELECTRIC FILTERS FOR DRY AND WET SEPARATION.
APTIC-26063 02

RATHWELL, PETER J.
AIR POLLUTION, PRE-EMPTION, LOCAL PROBLEMS AND THE CONSTITUTION--SOME PIGEONHOLES AND HATRACKS.
APTIC-25671 12

RAUCH, HANNS
ON INCREASED CHIMNEY HEIGHT.
APTIC-24585 05

RAUSCHER, J. A.
FIBER MIST ELIMINATORS FOR HIGHER VELOCITIES.
APTIC-26095 02

RAYNOR, GILBERT S.
RADIOACTIVE COPPER AS AN ATMOSPHERIC TRACER.
APTIC-24914 03

RAY, FRANCES KARR
A COMPARISON OF THE EFFECT ON RAYON FABRICS OF VARIOUS GASES UNDER CONTROLLED CONDITIONS.
APTIC-25772 09

READ, S. M.
REMOVAL OF SULFUR DIOXIDE FROM STACK GASES BY SEA WATER.
APTIC-26248 02

REAGAN, JOHN ALBERT
AN INVESTIGATION OF ATMOSPHERIC STRUCTURE IN THE LOWER TROPOSPHERE BY LIDAR PROBING.
APTIC-24795 05

REARDON, W. A.
A REVIEW AND COMPARISON OF SELECTED UNITED STATES ENERGY FORECASTS.
APTIC-26085 01

RECORD, F. A.
ANALYSIS OF LOWER ATMOSPHERIC DATA FOR DIFFUSION STUDIES. (FINAL REPORT).
APTIC-24761 05

REED, JOSEPH I.
INTERMITTENT AIR POLLUTION EPISODE IN NEW YORK CITY, 1962.
APTIC-25829 07

REED, ROBERT D.
FLARE STACK BURNER ASSEMBLY.
APTIC-25558 02

REES, R. L.
REMOVAL OF SULFUR DIOXIDE FROM POWER-PLANT STACK GASES.
APTIC-24916 02

REGAN, C. J.
MOTOR FUMES AND ATMOSPHERIC POLLUTION.
APTIC-24961 07

REHMAT, AMIRALI
SELECTIVE METHANATION OF CARBON MONOXIDE.
APTIC-25736 02

REILLY, J. J.
METAL HYDRIDES AS A SOURCE OF FUEL FOR VEHICULAR PROPULSION.
APTIC-24746 02

REIMAN, L. V.
THE USE OF SILOXENE FOR DETERMINING SMALL AMOUNTS OF NITROGEN DIOXIDE.
APTIC-24839 03

REINHARDT, GEORGE
A STUDY OF THE DECAY PROCESSES IN THE TRIPLET SULFUR DIOXIDE MOLECULE EXCITED AT 3828.8 A.
APTIC-26152 06

REMACLE, J.
FIRST OBSERVATIONS ABOUT ATMOSPHERIC ALLERGIC FUNGI IN SOUTHERN AND EASTERN BELGIUM.
APTIC-25876 04

RENNIE, R. P.
AIR POLLUTION AND ASSOCIATED HEALTH HAZARDS FROM DIESEL LOCOMOTIVE TRAFFIC IN A RAILWAY TUNNEL.
APTIC-26262 01

RENZETTI, N. A.
A COMPARATIVE STUDY OF OXIDANTS AND OZONE IN LOS ANGELES ATMOSPHERE.
APTIC-24597 03

REYNAUD, B.
ANALYSIS OF BLAST FURNACE GAS BY GAS-SOLID CHROMATOGRAPHY.
APTIC-25654 03

REYNOLDS, ROBERT N.
PSYCHOLOGICAL AND BEHAVIORAL EFFECTS.
APTIC-26156 07

REYNOLDS, R. W.
STUDIES ON THE COMBINED EFFECTS OF OZONE AND A HOT ENVIRONMENT ON REACTION TIME IN SUBHUMAN PRIMATES.
APTIC-25579 07

REZVUSHKIN, V. V.
AN EXPRESS DETERMINATION OF OZONE CONCENTRATION IN THE AIR.
APTIC-24691 03

RHODE, A.
RESPIRATOR FILTER PENETRATION USING SODIUM CHLORIDE AEROSOL.
APTIC-25611 03

RICHARDSON, FLORENCE
OXIDES OF NITROGEN AS A FACTOR IN COLOR CHANGES OF USED AND LAUNDERED COTTON ARTICLES.
APTIC-24608 09

RICHARDS, KARL M.
CONTROL DEVICES.
APTIC-25632 02

RICHTER, H. G.
OZONE CHEMILUMINESCENT STUDY. FINAL REPORT. PART II. RADIOACTIVE OZONE GENERATOR.
APTIC-26082 03

RICHTER, OSWALD
PLANT GROWTH AND LABORATORY ATMOSPHERE.
APTIC-24773 08

RICH, S.
PALLADIUM DEVICES FOR GAS CHROMATOGRAPHY.
APTIC-24665 03

RIEDIGER, GUENTHER
A CONDENSATION NUCLEI COUNTER WITH AN EXPANSION PROGRAMME.
APTIC-24780 03

RIGDON, R. H.
STOMACH CANCER AND AIR POLLUTION AN EXPERIMENTAL STUDY IN A PETROCHEMICAL AREA.
APTIC-26250 07

RIGG, R. G.
NEW WAY TO DESULFURIZE RESINS.
APTIC-24830 02

RINEHART, EDGAR A.
STATUS REPORT.
APTIC-23503 03

RIPPEL, A.
THE INFLUENCE OF FLUORINE EXHALATION ON THE FLORA IN THE SURROUNDINGS OF AN ALUMINUM PLANT.
APTIC-25661 08

RIVERS, J. L.
STEADY STATE AND NON-STEADY STATE DIFFUSION THEORY OF DROPLET GROWTH.
APTIC-25634 05

ROBBINS, L. A.
SINGLE DETECTOR AND FORECOLUMN TRAP FOR SERIES GAS-CHROMATOGRAPHY ANALYSIS.
APTIC-24699 03

ROBB, W. L.
PERMEABLE MEMBRANE.
APTIC-24694 02

ROBINSON, ELMER
EFFECT OF COLD STORAGE ON THE FLUORIDE CONTENT OF ALFALFA.
APTIC-24886 03

RODENBURG, GERD
METHOD FOR THE PREPARATION OF A CATALYST FOR THE CONVERSION OF H2S AND/OR SO2 TO ELEMENTARY SULFUR.
APTIC-24936 02

ROESNER, GERHARD
PROCESS FOR OBTAINING ELEMENTAL SULFUR FROM SULFUR DIOXIDE OR GASES CONTAINING IT.
APTIC-23385 02

ROE, F. J. C.
STUDIES OF THE MODE OF ACTION OF ASBESTOS AS A CARCINOGEN.
APTIC-24925 07

ROGERS, CHARLES ELLIS
INSTALLATION FOR THE ABSORPTION OF SULFUR DIOXIDE.
APTIC-24750 02

ROMOVETSKY, A.
DOSING OF SMALL AMOUNTS OF DUST BY MEANS OF A DOSATOR WITH A GRANULAR BASE.
APTIC-25906 08

ROMANOVSKY, J. C.
A COMPARATIVE STUDY OF OXIDANTS AND OZONE IN LOS ANGELES ATMOSPHERE.
APTIC-24597 03

CONSIDERATIONS IN DEVELOPING AIR QUALITY CRITERIA.
APTIC-25575 11

RONDIA, D.
EFFECT OF THE FEBRUARY 1959 FOGS ON THE POLYCYCLIC HYDROCARBON CONCENTRATION OF THE ATMOSPHERE OF THE LIEGE AREA.
APTIC-24923 04

ROSE JR, ANDREW H.
RESEARCH FINDINGS IN STANDARDS OF INCINERATOR DESIGN.
APTIC-24767 02

ROSENDAHL, FRITZ
RECENT PROCESSES FOR THE REMOVAL OF SULFUR COMPOUNDS FROM GASES, AS SEEN IN GERMAN PATENTS FOR THE YEAR 1964.
APTIC-24594 02

ROSINKSI, J.
PARTICLE TRAJECTORIES AND CAPTURE OF PARTICLES BY A SPHERE.
APTIC-25827 06

ROSINSKI, J.
ON THE ORIGIN OF ICE NUCLEI.
APTIC-24926 05

ROTHE, R.
ANIMAL EXPERIMENT INVESTIGATIONS OF CHRONIC CARBON DISULFIDE POISONING.
APTIC-25567 07

ROUNDS, D. E.
EFFECT OF AUTOMOBILE EXHAUST ON CELL GROWTH IN VITRO.
APTIC-25604 03

ROUSSEL, M.
REAL TIME SIMULATION OF ATMOSPHERIC BALLOON ENVIRONMENT.
APTIC-25823 05

ROYER, GEORGE W.
CALIBRATION OF A TWO-STAGE AIR SAMPLER.
APTIC-22722 03

RUEB, FRIEDMUND
A PROCESS FOR THE NEUTRALIZATION OF TOXIC VAPOURS AND WASTE GASES.
APTIC-24969 02

DUST REMOVAL, KEEPING AIR CLEAN AND REFUSE DISPOSAL.
APTIC-25860 02

RUHLING, AKE
REGIONAL DIFFERENCES IN THE DEPOSITION OF HEAVY METALS OVER SCANDINAVIA.
APTIC-23971 04

RUSTAMOV, P. G.
LIQUIDUS CURVE OF THE GA-SE-TE SYSTEMS.
APTIC-25675 06

RUTKOWSKA, KRYSTYNA
INVESTIGATION WITH THE ELECTRON MICROSCOPE OF AEROSOLS COLLECTED ON MEMBRANE FILTERS.
APTIC-24770 03

APTIC-24770 03

RUZICKA, M.
THE STUDY OF DAMAGES CAUSED BY AIR POLLUTION TO LIVE PLANTS AND PLANT COMMUNITIES.
APTIC-25927 08

RYAN, BILL C.
INFLUENCE OF CLIMATE AND TOPOGRAPHY ON OXIDANT AIR POLLUTION CONCENTRATIONS THAT DAMAGE CONIFER FORESTS IN SOUTHERN CALIFORNIA.
APTIC-25792 05

RYAN, T. G.
STUDY OF THE SO2 OXIDATION IN SOLUTION AND ITS ROLE IN ATMOSPHERIC CHEMISTRY.
APTIC-26185 02

RYBAKOV, B. N.
ATMOSPHERIC CORROSION OF TALLIUM.
APTIC-24619 09

RYBIN, E. N.
DEVELOPMENT OF MOLECULAR CONDENSATION NUCLEI AND CONDITIONS FOR ITS OBSERVATION.
APTIC-24764 06

SAFIN, R. SH.
INVESTIGATION OF THE PROCESSES OF MASS EXCHANGE AND CHEMOSORPTION IN ROTATION-TYPE EQUIPMENT.
APTIC-24769 02

SAKAI, NOBUYUKI
STUDIES ON DROPLET SIZE SPRAYED FROM HOLLOW CONE NOZZLES.
APTIC-26194 06

SAKAMOTO, SYUICHI
AN EXAMPLE OF FORMALDEHYDE GAS CONTROL PROJECT.
APTIC-26074 02

SALAM, ABDEL S.
FABRICATION OF MONODISPERSE LUCITE AND IRON OXIDE PARTICLES WITH A SPINNING DISK GENERATOR.
APTIC-26251 07

SALVIN, V. S.
EFFECT OF ATMOSPHERIC CONTAMINANTS ON LIGHTFASTNESS TESTING.
APTIC-24906 09

ADVANCES IN THEORETICAL AND PRACTICAL STUDIES OF GAS FADING.
APTIC-24965 09

SANDERSON, H. P.
TIME CONSTANT OF A THOMAS AUTOMETER AND SIGNIFICANCE OF INDICATED RESPONSE.
APTIC-25777 03

SANO, HIROSHI
ABSORPTION OF SO2 GAS BY VARIOUS SOLVENTS.
APTIC-24735 02

SARAF, S. D.
A DOUBLE BRADSHER REACTION.
APTIC-25659 06

SARINGER, MAGDOLNA KERTESZNE
BENZPYRENE CONTENT OF DUST SAMPLES COLLECTED ON URBAN AND RURAL SETTLEMENTS AND IN INDUSTRIAL PLANTS 3,4.
APTIC-25565 04

SARUTA, NANIO
RELATIONSHIP BETWEEN AIR POLLUTION AND ASTHMATIC DISEASES AMONG PRIMARY SCHOOL CHILDREN IN KITA-KYUSHU. PART I. STATISTICAL ANALYSIS BASED ON QUESTIONNAIRES.
APTIC-25739 07

SARUTA, NANIO
ON RELATIONSHIP OF CHRONIC RESPIRATORY DISEASES TO AIR POLLUTION.
APTIC-26032 07

SASAKI, MASAICHI
A TENTATIVE PLAN CONCERNING A COMPREHENSIVE ASSESSMENT OF ENVIRONMENTAL POLLUTION.
APTIC-26304 04

SATAKE, JIRO
WATER PERMEABILITY OF RUST LAYER FORMED BY ATMOSPHERIC CORROSION.
APTIC-24671 09

SATO, MITSUO
THE DISTRIBUTION OF CARBON, VANADIUM AND NICKEL DEPOSITS ON CATALYST LAYER DURING HYDRODESULFURIZATION PROCESSES OF PETROLEUM RESIDUM.
APTIC-26129 02

SATO, T.
RESPECTIVE DETERMINATION OF NO AND NO2.
APTIC-26291 03

SAVELEV, YU. V.
DISTRIBUTION OF CARBON DIOXIDE AND SULFUR CONTAINING IMPURITIES IN THE GAS DISTRIBUTION STREAM.
APTIC-25547 02

SAVRAEV, V. P.
FINE FILTRATION OF PROCESS AND WASTE GASES FROM LEAD PRODUCTION WITH THE AID OF JET BLAST BAG FILTERS.
APTIC-24771 02

SAWATA, T.
RESPECTIVE DETERMINATION OF NO AND NO2.
APTIC-26291 03

SAWICKI, EUGENE
POLYNUCLEAR AROMATIC HYDROCARBON COMPOSITION OF THE ATMOSPHERE IN SOME LARGE AMERICAN CITIES.
APTIC-25693 04

SAWYER, FREDERICK G.
AIR POLLUTION.
APTIC-24759 14

SAWYER, ROBERT F.
REDUCING JET POLLUTION BEFORE IT BECOMES SERIOUS.
APTIC-26101 02

SAWYER, R. F.
THE EFFECTS OF LEAD ADDITIVES ON REACTIONS IN EXHAUST SYSTEMS.
APTIC-25501 01

OXIDES OF NITROGEN IN THE COMBUSTION PRODUCTS OF AN AMMONIA FUELED RECIPROCATING ENGINE.
APTIC-25825 01

SCHAECKE, GUSTAV
ASSESSING THE DEGREE OF EXPOSURE TO DUST AND OCCUPATIONAL EPIDEMIOLOGY.
APTIC-25543 07

SCHAEFER, VINCENT J.
CONDENSATION NUCLEI PRODUCTION OF VERY LARGE NUMBERS IN COUNTRY AIR.
APTIC-24803 05

SCHAFFERNICHT, HEINZ
THE BEHAVIOR OF THE AIR GERM COUNT IN AN ELECTROSTATIC FIELD.
APTIC-25077 02

SCHEIDEL, C.
CHEMICAL ENGINEERING METHODS FOR REMOVING INORGANIC EMISSIONS.
APTIC-24756 02

SCHEINBAUM, M. L.
ADDITION OF DINITROGEN TRIOXIDE TO NONCONJUGATED DIENES.
APTIC-24165 06

SCHERER, E.
ON THE ROENTGENOLOGICAL DETECTABILITY OF DUST DEPOSITS IN THE LUNGS. STUDIES ON THE ALDERSON-RANDO PHANTOM.
APTIC-18289 06

SCHILTER, CHRISTOPHER
EXHAUST EMISSION CONTROL BY FUEL INJECTION THE VW 1600 WITH ELECTRONICALLY CONTROLLED FUEL INJECTION SYSTEM.
APTIC-26147 02

SCHIRZ, STEFAN
ON PROTECTION AGAINST EMISSION REMOVAL OF OFFENDING SMELLS.
APTIC-25850 02

SCHMIDT, GERHARD
SEPARATION EFFICIENCY OF ROOM AIR STERILIZATION EQUIPMENT COMPARED WITH DUST PARTICLES OF DIFFERENT SIZES.
APTIC-25568 02

SCHMIDT, W. L.
OXIDES OF NITROGEN IN THE COMBUSTION PRODUCTS OF AN AMMONIA FUELED RECIPROCATING ENGINE.
APTIC-25825 01

SCHOELLMANN, EDGAR
STATISTICAL PROCESSING OF DATA GATHERED BY THE RESEARCH REACTOR OF THE METEOROLOGICAL STATION IN MUNICH.
APTIC-25645 05

SCHOLZ, F.
THE PRODUCTION OF NUCLEI BY PHOTOCHEMICAL DECOMPOSITIONS OF HYDROGEN SULFIDE.
APTIC-24779 05

SCHREINICKE, GERT
THE BEHAVIOR OF THE AIR GERM COUNT IN AN ELECTROSTATIC FIELD.
APTIC-25077 02

SCHUBERT, CARL
DUST IN THE CARIBBEAN ATMOSPHERE TRACED TO AN AFRICAN DUST STORM.
APTIC-24632 05

SCHUETZ, H.
THE USE OF ELECTROFILTERS IN AIR CONDITIONING.
APTIC-24847 02

SCHULZ, E. J.
A TRACER TECHNIQUE TO MEASURE DEPOSITION OF STACK EMISSIONS.
APTIC-26139 03

SCHUMAN, JACK J.
THE SOLUTION OF AIR POLLUTION CAN CAUSE WATER POLLUTION.
APTIC-24842 02

SCHUMAN, LEONARD M.
NITROGEN DIOXIDE POISONING IN SILO ATMOSPHERES. (SILO-FILLERS' DISEASE).
APTIC-25586 07

SCHWAB, CAROL MEYERS
ELECTRONIC ABSORPTION SPECTRA OF INORGANIC AND ORGANIC COMPOUNDS OF NITROGEN. I. NITROGEN DIOXIDE-DINITROGEN TETROXIDE IN SOLUTION.
APTIC-26253 06

SCHWAB, LOUIS
SELF-SEALING AND SELF-HOLDING FILTER FRAME.
APTIC-25559 02

SCHWARTZ, SAMUEL M.
ELECTROSTATIC FLOCKING APPARATUS.
APTIC-25718 02

SCOFIELD, FRANCIS
PAINT INDUSTRY SMOG CHAMBER. I. DESIGN AND VALIDATION OF A SMOG CHAMBER.
APTIC-24711 07

SCOGGINS, MAX F.
ATMOSPHERE SAMPLING DEVICE.
APTIC-25712 03

SCOGGINS, M. F.
ATMOSPHERIC PHYSICS. ATMOSPHERIC DIFFUSION, DEPOSITION, AND TRANSPORT. (ANNUAL REPORT).
APTIC-24962 05

SCORER, R. S.
SYMPOSIUM ON THE DISPERSION OF CHIMNEY GASES. II.
APTIC-24869 05

SCOTT, WILLIAM E.
AEROSOL FORMATION FROM GASEOUS AIR POLLUTANTS.
APTIC-24921 05

SEIFERT, WERNER
SPECIAL FEATURES OF THE 140 MW TURBINE OF THE DUISBURG POWER PLANT.
APTIC-26237 01

SEKIKAWA, TOSHIO
ON THE SIMULTANEOUS MEASUREMENTS OF THE PARTICLE SIZE DISTRIBUTION OF RADIOACTIVE CHARGED AEROSOLS AND CONCENTRATION RATIO OF POSITIVE TO NEGATIVE.
APTIC-25834 03

SELIKOFF, I. J.

WIDENING SPECTRUM OF ASBESTOS DISEASE.
APTIC-24934 07

SELIN, A. N.
CARBON DISULFIDE--HYDROGEN SULFIDE BALANCE IN THE PRODUCTION OF VISCOSE TEXTILE FIBERS.
APTIC-25791 02

SELIN, L. E.
THE PHOTOELECTRON SPECTRA OF O2, N2 AND CO.
APTIC-24889 06

SELL, P. J.
SEDIMENTATION OF POWDERED SOLIDS.
APTIC-24973 06

SENSHU, TOSHIO
DIFFUSION OF SMOKE FROM A HIGH STACK.
APTIC-26141 05

SERIFF, NATHAN S.
INTERMITTENT AIR POLLUTION EPISODE IN NEW YORK CITY, 1962.
APTIC-25829 07

SERPOLAY, R.
PENETRATION OF AN INVERSION LAYER BY AN INDUSTRIAL CUMULUS.
APTIC-24583 05

SERRA-CASTELAN, SERGIO
AIR POLLUTION II. METEOROLOGICAL ASPECTS OF URBAN POLLUTION.
APTIC-24669 05

SHAFFER, N. R.
AIR POLLUTION   FURNACE TYPES AND SIZES DICTATE MOST EFFECTIVE CONTROLS. PART I.
APTIC-26166 02

SHAW, F. M.
AIR POLLUTION FROM IRONFOUNDRY CUPOLAS.
APTIC-25783 01

SHCHEGLOV, V. L.
THE USE OF SILOXENE FOR DETERMINING SMALL AMOUNTS OF NITROGEN DIOXIDE.
APTIC-24839 03

SHCHERBAKOV, A. P.
REACTION OF TREES AND SHRUBBERY TO AIR POLLUTION IN THE FOREST-PARK BELT OF MOSCOW AND MEASURES FOR EXTENDING THE LIFESPAN OF PLANTS.
APTIC-24733 08

SHEARER, J. W.
CHANGES IN ROTATIONAL CONSTANTS IN SOME PI-SIGMA BANDS OF HCN AND H2O.
APTIC-25673 06

SHEEHAN, T. V.
METAL HYDRIDES AS A SOURCE OF FUEL FOR VEHICULAR PROPULSION.
APTIC-24746 02

SHELL, ALLEN D.
PRACTICAL GAS TREATING. PART 4. HYDROCARBON/EG RATIO IS KEY TO SEPARATION OF EMULSION.
APTIC-24870 02

SHELTON, CHESTER H.
AIR POLLUTION CONTROL DEVICE FOR ENGINES.
APTIC-25566 02

SHENFIELD, L.
ONTARIO'S AIR POLLUTION INDEX.
APTIC-24635 04

SHEPARD, DONALD S.
A LOAD SHIFTING MODEL FOR AIR POLLUTION CONTROL IN THE ELECTRIC POWER INDUSTRY.
APTIC-24681 02

SHIBA, TADAO
ON DEVELOPMENT OF DESULFURIZATION TECHNOLOGY   ONE OF MITI'S BIG PROJECTS.
APTIC-26005 02

SHIBLER, B. K.
PROCESSES FOR RECOVERING SULFUR FROM SECONDARY SOURCE MATERIALS.
APTIC-22809 02

SHIBUSAWA, Y.
SYMPOSIUM   RECENT PROBLEMS ON AUTOMOTIVE FUELS.
APTIC-26134 02

SHIDELER, HAROLD W.
METHOD AND APPARATUS FOR RECYCLING DRYER STACK GASES.
APTIC-25863 02

SHIDELER, MARY E.
SPECTROPHOTOMETRIC DETERMINATION OF BERYLLIUM AND FLUORIDE USING CHROME AZUROL S.
APTIC-25952 03

SHIGETA, AYAMICHI
ON THE AIR POLLUTION BY RED OCHRE FACTORIES IN MITSU-CHO. OKAYAMA PREFECTURE, JAPAN.
APTIC-26029 04

ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE (I).
APTIC-26045 04

ON THE TYPE OF AIR POLLUTION OF MIZUSHIMA, OKAYAMA PREFECTURE.
APTIC-26282 04

SHIGETA, Y.
RESEARCH ON ODOR CONTROL IN THE U.S.A. (A CHAPTER OF RENDERING PLANTS IN WEST COAST).
APTIC-26057 12

SHIKHVARGER, F. D.
USE OF ELECTROLYSIS TO DETERMINE TRACE AMOUNTS OF LEAD, COPPER, AND ZINC IN STUDIES OF THE ATMOSPHERE.
APTIC-25979 03

SHIMIZU, M.
TREATMENT OF DUST GENERATED AT IRON MILL.
APTIC-26003 02

SHIMIZU, H.
CONCENTRATION/RECOVERY METHOD FOR LOW-DENSITY SULFUR DIOXIDE.
APTIC-26039 02

SHIMIZU, YOSHIKAZU
THE DISTRIBUTION OF CARBON, VANADIUM AND NICKEL DEPOSITS ON CATALYST LAYER DURING HYDRODESULFURIZATION PROCESSES OF PETROLEUM RESIDUM.
APTIC-26129 02

SHIMKIN, MICHAEL B.
AIR POLLUTANT EXPOSURE AND RESPIRATORY CANCER.
APTIC-25765 07

SHIMOURA, KAZUKUNI
DE-ENTRAINMENT IN PLATE COLUMN.
APTIC-25573 02

SHIOYA, KATSUO
ON THE INVESTIGATION OF PUBLIC NUISANCE IN AJIMANO AREA, TAKEFU CITY.
APTIC-26028 04

SHIRAI, Y.
MANUFACTURING METHOD OF ACTIVATED CHARCOAL.
APTIC-24672 02

SHOEMAKE, G. R.
PALLADIUM DEVICES FOR GAS CHROMATOGRAPHY.
APTIC-24665 03

SHUPE, JAMES L.
LEVELS OF TOXICITY TO ANIMALS PROVIDE SOUND BASIS FOR FLUORIDE STANDARDS.
APTIC-24944 08

THE EFFECT OF FLUORINE ON DAIRY CATTLE. V. FLUORINE IN THE URINE AS AN ESTIMATOR OF FLUORINE INTAKE.
APTIC-25735 08

SHUPE, J. LE GRANDE
THE CHEMISTRY, HISTOLOGY, AND ROENTGENOLOGY OF THE TEETH AND BONES OF LARGE ANIMALS.
APTIC-25945 08

SHUTKIN, G. A.
INVESTIGATION OF MASS TRANSFER IN A SCRUBBER WITH TAPERED-SLOT TRAYS.
APTIC-24885 02

SHY, CARL M.
NITROGEN DIOXIDE AND LOWER RESPIRATORY ILLNESS.
APTIC-25966 07

SHY, C. M.
HAIR TRACE METAL LEVELS AND ENVIRONMENTAL EXPOSURE.
APTIC-24716 07

SIDEBOTTOM, HOWARD
A STUDY OF THE DECAY PROCESSES IN THE TRIPLET SULFUR DIOXIDE MOLECULE EXCITED AT 3828.0 A.
APTIC-26152 06

SIEGEL, ROBERT
REMOVAL OF LEAD FROM AUTOMOBILE EXHAUSTS BY MOLTEN SALTS.
APTIC-26064 02

SIETH, JOACHIM
APPARATUS FOR CONTINUOUSLY MEASURING THE CONCENTRATION OF A GAS-MIXTURE COMPONENT.
APTIC-25637 03

SIGWORTH JR, H. W.
THE DISAPPEARANCE OF ETHYLENE, PROPYLENE, N-BUTANE, AND 1-BUTANE IN SPARK-IGNITION ENGINE EXHAUST.
APTIC-24740 01

SILVERMAN, LESLIE
ENGINEERING RESEARCH AND DEVELOPMENT IN AIR-POLLUTION CONTROL.
APTIC-25773 02

A FILTER PAPER METHOD FOR LEAD FUME COLLECTION.
APTIC-25793 03

SILVERMAN, LOUIS
SPECTROPHOTOMETRIC DETERMINATION OF BERYLLIUM AND FLUORIDE USING CHROME AZUROL S.
APTIC-25952 03

SIMMONDS, P. G.
PALLADIUM DEVICES FOR GAS CHROMATOGRAPHY.

APTIC-24665 03

SIMPSON, C. L.
DEVELOPMENT OF AN ATMOSPHERIC TRANSPORT MODEL.
APTIC-24606 05

ATMOSPHERIC PHYSICS. ATMOSPHERIC DIFFUSION, DEPOSITION, AND TRANSPORT. (ANNUAL REPORT).
APTIC-24962 05

SINCLAIR, DAVID
MEASUREMENT OF AVERAGE PARTICLE SIZE IN AEROSOLS BY LIGHT SCATTERING.
APTIC-24791 03

SINGER, I. A.
THE RISE OF BOUYANT CLOUDS.
APTIC-25819 05

SITNIKOVA, A. S.
CHARACTERISTICS OF PHOTOSYNTHESIS AND OF SOME OTHER PROCESSES IN CONNECTION WITH SMOKE AND GAS RESISTANCE OF TREES AND SHRUBS.
APTIC-24593 08

SKAU, EVALD L.
APPLICATION OF MERCURY-INTRUSION METHOD FOR DETERMINATION OF PORE-SIZE DISTRIBUTION TO MEMBRANE FILTERS.
APTIC-24856 02

SKINNER, A. L.
MODEL TESTS ON FLOW FROM A BUILDING VENTILATION STACK.
APTIC-24803 05

SKOPP, A.
SYSTEMS STUDY OF NITROGEN OXIDE CONTROL METHODS FOR STATIONARY SOURCES.
APTIC-12619 02

CONTROL OF NITROGEN OXIDE EMISSIONS FROM STATIONARY COMBUSTION SOURCES.
APTIC-24678 02

SKRIVANEK, JAROSLAV
ABSORPTION OF SULFUR DIOXIDE IN A VENTURI TUBE.
APTIC-25768 02

SMALLEY, GEORGE E.
RECOVERY OF REFINERY SULFUR IN AIR-POLLUTION CONTROL.
APTIC-24792 02

SMIRNOV, B. A.
FINE FILTRATION OF PROCESS AND WASTE GASES FROM LEAD PRODUCTION WITH THE AID OF JET BLAST BAG FILTERS.
APTIC-24771 02

SMITH, ALAN W.
USE OF THERMODESORPTION TECHNIQUE FOR STUDYING GAS ADSORPTION CARBON MONOXIDE ON NICKEL.
APTIC-25866 06

SMITH, C. W.
LICHENS AS AN INDICATOR OF AIR POLLUTION.
APTIC-25655 03

SMITH, D. S.
THE EFFECTS OF LEAD ADDITIVES ON REACTIONS IN EXHAUST SYSTEMS.
APTIC-25581 01

SMITH, FRANK A.
THE EFFECTS OF THE ABSORPTION OF FLUORIDE. V. THE CHEMICAL DETERMINATION OF FLUORIDE IN HUMAN SOFT TISSUES FOLLOWING PROLONGED INGESTION OF FLUORIDE AT VARIOUS LEVELS.
APTIC-25946 07

SMITH, GARLAND W.
FLAME PHOTOMETRIC DETERMINATION OF LEAD AND MANGANESE IN GASOLINE.
APTIC-24719 03

SMITH, J. E.
SOPHISTICATED SYSTEMS REQUIRED TO MONITOR HEAVIER POLLUTION.
APTIC-26256 03

SMITH, K. R.
PERFORMANCE OF A CONTINUOUS COLORIMETRIC AIR MONITOR.
APTIC-24728 03

SMITH, MONA FRANCK
SPECTROCHEMICAL DETERMINATION OF FLUORINE IN PORCELAIN ENAMEL FRITS.
APTIC-26209 03

SMITH, M. E.
THE RISE OF BOUYANT CLOUDS.
APTIC-25819 05

SMITH, RALPH G.
EFFECTS OF AIR POLLUTION ON ANIMALS EXPOSED TO STREET ATMOSPHERES IN DETROIT.
APTIC-24964 07

SMITH, WALTER J.
DRY FIBROUS AIR FILTER MEDIA. PERFORMANCE CHARACTERISTICS.
APTIC-24802 02

SMITH, W. L.
THE DETERMINATION OF CHRYSOTILE IN AIRBORNE ASBESTOS.
APTIC-25656 03

SMITH JR, HENRY F.
THE TOXICOLOGICAL BASIS OF THRESHOLD LIMIT VALUES 1. EXPERIENCE WITH THRESHOLD LIMIT VALUES BASED ON ANIMAL DATA.
APTIC-25917 11

SNOWDEN, F. CURTIS
INSTRUMENTATION IN POLLUTION CONTROL.
APTIC-25990 03

SONDEL, JAMES A.
ACTIVATION ANALYSIS OF AIRBORNE SELENIUM AS A POSSIBLE INDICATOR OF ATMOSPHERIC SULFUR POLLUTANTS.
APTIC-26069 03

SOO, S. L.
GAS DYNAMICS OF ACCELERATING PARTICULATE FLOW IN CIRCULAR DUCTS.
APTIC-24726 06

SORENSON, S. C.
THE REACTION OF ETHANE IN SPARK IGNITION ENGINE EXHAUST GAS.
APTIC-24747 01

SOUTHERLAND, JAMES H.
CHATTANOOGA, TENNESSEE -- ROSSVILLE, GEORGIA INTERSTATE AIR QUALITY STUDY 1967-1968.
APTIC-26086 08

SPAITE, PAUL W.
POLLUTION FROM COMBUSTION OF FOSSIL FUELS.
APTIC-24732 01

SPEER, FREDERIC
TOBACCO AND THE NONSMOKER. A STUDY OF SUBJECTIVE SYMPTOMS.
APTIC-24893 07

APTIC-24893 07

SPEIGELMAN, JACK R.
FABRICATION OF MONODISPERSE LUCITE AND IRON OXIDE PARTICLES WITH A SPINNING DISK GENERATOR.
APTIC-26251 07

SPEIZER, FRANK E.
EFFECTS OF PHOTOCHEMICAL POLLUTANTS ON THE RESPIRATORY TRACT.
APTIC-26227 07

SPINDLER, DONALD C.
SPECTROCHEMICAL DETERMINATION OF FLUORINE IN PORCELAIN ENAMEL FRITS.
APTIC-26209 03

SPURNY, K.
PREPARATION OF RADIOACTIVELY LABELLED CONDENSATION AEROSOLS. I. AEROSOLS OF SODIUM CHLORIDE, SILVER IODIDE AND SULPHURIC ACID.
APTIC-25801 06

ANALYTICAL METHODS FOR DETERMINATION OF AEROSOLS WITH HELP OF MEMBRANE ULTRAFILTERS. VI. ON THE MECHANISM OF MEMBRANE ULTRAFILTER ACTION.
APTIC-25956 03

ANALYTICAL METHODS FOR DETERMINATION OF AEROSOLS BY MEANS OF MEMBRANE ULTRAFILTERS. VII. DIFFUSION AND IMPACTION PRECIPITATION OF AEROSOL PARTICLES BY MEMBRANE ULTRAFILTERS.
APTIC-26266 03

SQUIRES, ARTHUR M.
A REACTION WHICH PERMITS THE CYCLIC USE OF CALCINED DOLOMITE TO DESULFURIZE FUELS UNDERGOING GASIFICATION.
APTIC-24762 02

STAFFORD, EARL
DRY FIBROUS AIR FILTER MEDIA. PERFORMANCE CHARACTERISTICS.
APTIC-24802 02

STAFFORD, RONALD G.
EFFICIENCY OF IPC-1478 FILTER PAPER AGAINST POLYSTYRENE LATEX AND DIOCTYL PHTHALATE AEROSOLS.
APTIC-22190 03

STAHL, HARALD
PROCESS FOR THE REMOVAL AND RECLAMATION OF SULFUR DIOXIDE FROM FLUE GASES.
APTIC-26164 02

STARKMAN, E. S.
OXIDES OF NITROGEN IN THE COMBUSTION PRODUCTS OF AN AMMONIA FUELED RECIPROCATING ENGINE.
APTIC-25825 01

STARKOVA, BELA
STANDARD METHODS OF FILTER TESTING.
APTIC-25674 02

STARKOVA, B.
METHOD AND EQUIPMENT FOR MAKING PREPARATIONS OF MICROSCOPIC PARTICLES OF SOLID SUBSTANCES.
APTIC-24598 03

STASCHIK, GUENTER
SEPARATION OF PLASTICIZER MISTS IN THE PROCESSING OF PVC MIXTURES.
APTIC-24937 02

STAUBING, PETER
TRENDS OF CLEANING SUPPLY AND EXHAUST AIR IN PROCESS ENGINEERING.
APTIC-24654 02

STIENKEN, GERHARD
METHOD FOR THE PREPARATION OF A CATALYST FOR THE CONVERSION OF H2S AND/CR SO2 TO ELEMENTARY SULFUR.
APTIC-24936 02

STEIGERWALD, B. J.
TURNAROUNDS, EQUIPMENT MAINTENANCE, AND BLOWDOWN SYSTEMS.
APTIC-24602 01

STEINBERG, MEYER
OZONE SYNTHESIS FOR WATER TREATMENT BY HIGH ENERGY RADIATION.
APTIC-24041 06

STEINBERG, M.
THE WESTERN COAL DEPOSITS A NATIONAL SOURCE OF POWER.
APTIC-24955 01

STEINER, PAUL E.
CARCINOGENIC HYDROCARBONS AND RELATED COMPOUNDS IN PROCESSED RUBBER.
APTIC-24629 01

APTIC-24629 01

THE CONDITIONAL BIOLOGICAL ACTIVITY OF THE CARCINOGENS IN CARBON BLACKS, AND ITS ELIMINATION.
APTIC-24640 07

STEIN, ANDREW M.
CHEMICAL MODELS FOR COMBUSTION AND ATMOSPHERIC POLLUTION.
APTIC-25963 06

STEMBRIDGE, V. A.
A SENSITIVE PROCEDURE FOR DETERMINING CARBON MONOXIDE IN BLOOD OR TISSUE UTILIZING GAS-SOLID CHROMATOGRAPHY.
APTIC-26252 07

STEMMER, KLAUS L.
EXPERIMENTAL CARCINOGENESIS OF THE LUNG. II. INFLUENCE OF PHENOLS IN THE PRODUCTION OF CARCINOMA.
APTIC-24633 07

STEPHENS, DONALD
ELECTRONIC ABSORPTION SPECTRA OF INORGANIC AND ORGANIC COMPOUNDS OF NITROGEN. I. NITROGEN DIOXIDE-DINITROGEN TETROXIDE IN SOLUTION.
APTIC-26253 06

STEPHENS, EDGAR R.
AEROSOL FORMATION FROM GASEOUS AIR POLLUTANTS.
APTIC-24921 05

THE FORMATION, REACTIONS, AND PROPERTIES OF PEROXYACYL NITRATES (PANS) IN PHOTOCHEMICAL AIR POLLUTION.
APTIC-26235 05

STEPIN, B. D.
ATMOSPHERIC IMPURITIES AND THE PROBLEM OF OBTAINING EXTRA PURE SUBSTANCES.
APTIC-25676 14

STERLING, JOHN JEROME
METHOD AND APPARATUS FOR DETERMINING THE PRESENCE OF VAPOR IN A GAS.
APTIC-25912 03

STERN, ARTHUR C.
ADMINISTRATIVE NEEDS AND PATTERNS OF AIR-POLLUTION CONTROL.
APTIC-25774 12

STERN, A. C.
FOREIGN PROFILES IN AIR POLLUTION CONTROL ACTIVITIES SPECIAL SOURCES OF INFORMATION.
APTIC-26168 12

STEVENS, R. K.
CHEMILUMINESCENT MEASUREMENT OF ATMOSPHERIC OZONE RESPONSE CHARACTERISTICS AND OPERATING VARIABLES.
APTIC-25653 03

STEYERMARK, AL
MICRO-PARR ASSEMBLY SUITABLE FOR MICRODETERMINATION OF FLUORINE IN ORGANIC COMPOUNDS.
APTIC-25752 03

STCCKTON, EDWARD L.
ANALYTICAL INSTRUMENTATION FOR MONITORING AIR AND WATER POLLUTION.
APTIC-26189 03

STRATMANN, HEINRICH
POSSIBILITY OF THE ANALYTICAL DETERMINATION OF DOSE-THRESHOLD VALUE RELATIONSHIPS.
APTIC-24832 07

STRATMANN, H.
NITROGEN DIOXIDE IMMISSIONS IN SOME SELECTED DISTRICTS OF THE STATE OF NORDRHEIN-WESTFALEN.
APTIC-24807 04

EXPERIMENTAL STUDY OF THE EFFECT OF NITROGEN DIOXIDE ON PLANTS.
APTIC-24808 08

THE MEASUREMENT OF AIR POLLUTION AND THE ESTABLISHMENT OF CRITERIA FOR THE EVALUATION OF AIR QUALITY.
APTIC-24907 11

AN ARTICLE DEALING WITH SULFUR DIOXIDE EMISSIONS AND THEIR EFFECTS ON VEGETATION.
APTIC-26174 04

STREKALOV, P. V.
ATMOSPHERIC CORROSION OF ZINC- AND CADMIUM-COATED STEEL AND THE COEFFICIENTS FOR RECALCULATING THE RESULTS OF ACCELERATED CORROSION TESTS INTO DATA FOR SERVICE CONDITIONS.
APTIC-24972 09

STRENK, F.
DOSING OF SMALL AMOUNTS OF DUST BY MEANS OF A DOSATOR WITH A GRANULAR BASE.
APTIC-25906 08

STUMBAR, J. P.
PROPAGATION VELOCITY AND FLAME SPREAD THROUGH SIMULATED FUEL BEDS.
APTIC-25989 06

SUCHANNEK, RUDOLF G.
ELECTRIC PROPERTIES OF ICE FOG CRYSTALS.
APTIC-24663 05

SUDA, KAZUKO
A HEALTH-SOCIOLOGICAL STUDY ON PNEUMOCONIOSIS IN A COPPER MINE AFTER THE ENFORCEMENT OF THE PNEUMOCONIOSIS LAW.
APTIC-25722 07

SUGAWARA, FUMIKO
ABSTRACTS OF PAPERS ON INDOOR AIR POLLUTION (SUSPENDED PARTICULATES) CONTROL IN ARCHITECTURE. PART I.
APTIC-24684 03

SUGAWARA, V.
THE DETERMINATION OF HEAVY METALS IN DUSTFALL BY ATOMIC-ABSORPTION-SPECTROPHOTOMETRY.
APTIC-25535 03

SUGIYAMA, TADASHI
ADSORPTION DESULFURIZATION METHOD FOR GASEOUS SUBSTANCES CONTAINING HYDROGEN SULFIDE.
APTIC-24818 02

SUN, S. C.
NASOPHARYNGEAL CARCINOMA AND ENVIRONMENTAL CARCINOGENS.
APTIC-24880 07

SUSSMAN, V. H.
AIR BLOWING.
APTIC-24723 01

SUVEGES, EVA
THE EFFECT OF HEAT TREATMENT ON THE STRUCTURE OF KAOLIN AND ITS IN VITRO HEMOLYTIC ACTIVITY.
APTIC-25831 07

SUWA, Y.
CONCENTRATION/RECOVERY METHOD FOR LOW-DENSITY SULFUR DIOXIDE.
APTIC-26039 02

SUZUKI, YOSHITO
REFUSE TREATMENT BY COMPRESSION.
APTIC-26125 02

SUZUKI, SHIGEAKI
ON UOP RCD ISOMAX METHOD.
APTIC-26133 02

SUZUKI, SHIN
CHEMICAL PROBLEMS IN AIR POLLUTION.
APTIC-26198 05

SUZUKI, S.
PRODUCTION AND COST OF LEADLESS GASOLINE.
APTIC-26021 02

SUZUKI, TAKASHI
A TENTATIVE PLAN CONCERNING A COMPREHENSIVE ASSESSMENT OF ENVIRONMENTAL POLLUTION.
APTIC-26304 04

SUZUKI, TOSHIO
AN EXAMPLE OF FORMALDEHYDE GAS CONTROL PROJECT.
APTIC-26074 02

SWANSON, R. N.
ANALYSIS OF LOWER ATMOSPHERIC DATA FOR DIFFUSION STUDIES. (FINAL REPORT).
APTIC-24761 05

SYKES, W.
PROBLEMS OF ELECTRICAL PRECIPITATION REVIEWED.
APTIC-25643 02

SYMINGTON, LLOYD
A GUIDE TO THE AIR QUALITY ACT OF 1967.
APTIC-24930 12

SZILAGYI, LAJOS
PERMANENT DAMAGE TO THE NERVOUS SYSTEM CAUSED BY CARBON MONOXIDE POISONING OF A FETUS.
APTIC-26160 07

SZIRTES, LAJOS
PROPOSAL FOR A UNIFORM EVALUATION OF THE DANGER OF PNEUMOCONIOSIS.
APTIC-24649 07

TABATA, TOSHIHIDE

THE STATISTICAL SURVEY ON UPPER RESPIRATORY REGION OF SCHOOLCHILDREN IN THE AIR POLLUTION AREA IN WAKAYAMA.
APTIC-26114 07

TADMOR, J.
THE MAKING OF SUTTON'S EQUATION CORRECTED FOR DEPOSITION.
APTIC-25669 05

TAGO, YOSHITOSHI
STUDIES ON DROPLET SIZE SPRAYED FROM HOLLOW CONE NOZZLES.
APTIC-26194 06

TANADA, ISAO
RESEARCHES ON AUTO EXHAUST GAS POLLUTION AND TRAFFIC NOISES I. TOKUSHIMA CITY. PART I.
APTIC-26284 04

TAHERI, MANSOOR
SEPARATION OF SMALL PARTICLES FROM AIR IN A SIEVE PLATE COLUMN.
APTIC-24793 02

TAKAGI, T.
PRESENT STATUS OF DESULFURIZATION TECHNIQUE (1).
APTIC-22100 02

TAKAHASHI, AKIRA
RESEARCH AND DEVELOPMENT OF STACK GAS DESULFURIZATION PROCESS.
APTIC-25702 02

TAKAHASHI, T.
CONCERN TO INFLUENCE OF AERIAL BACTERIUM, ESPECIAL, ABOUT PATHOGENIC STAPHYLOCOCCUS E.
APTIC-26012 01

TAKAMIYA, K.
SULFUR OXIDES BY OIL-FIRING.
APTIC-26119 02

TAKASHIMA, YOICHI
A FORMATION AND MOVEMENT OF DROPLET (NO. 2) (IN GAS-LIQUID PHASE).
APTIC-24884 06

STUDIES ON DROPLET SIZE SPRAYED FROM HOLLOW CONE NOZZLES.
APTIC-26194 06

TAKATSUKA, YOSHIKAZU
ZINC ACETATE CYLINDER METHOD (INTEGRAL) FOR HYDROGEN SULFIDE IN THE AIR AS AIR POLLUTANT.
APTIC-25572 03

PRESENT STATE OF AIR POLLUTION IN YOKKAICHI AND VARIOUS MEDICAL PROBLEMS ABOUT IT.
APTIC-26305 07

TAKAYA, YOICHI
ON THE AIR POLLUTION BY RED OCHRE FACTORIES IN MITSU-CHO. OKAYAMA PREFECTURE, JAPAN.
APTIC-26029 04

ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE (I).
APTIC-26045 04

ON THE TYPE OF AIR POLLUTION OF MIZUSHIMA, OKAYAMA PREFECTURE.
APTIC-26282 04

TAKEI, KAZUO
DIESEL ENGINE EXHAUST SMOKE.
APTIC-24845 01

TAMURA, KAZUO
THE STATISTICAL SURVEY ON UPPER RESPIRATORY REGION OF SCHOOLCHILDREN IN THE AIR POLLUTION AREA IN WAKAYAMA.
APTIC-26114 07

TAMURA, SACHIKO
GAMMA RAY SPECTROMETRY OF THE NATURAL RADIOACTIVITY IN THE AIRBORNE DUST.
APTIC-25758 04

TAMURA, ZENSUKE
GAS PURIFICATION DEVICE.
APTIC-24821 02

METHOD OF ELIMINATING SULFUR DIOXIDE AND HYDROGEN SULFIDE FROM EXHAUST GAS.
APTIC-24846 02

TAMURA, Z.
COMBUSTION EMISSION GAS DISPOSAL METHOD.
APTIC-26104 02

TANAKA, EIICHI
EBULLATED (SIC) BED H-OIL METHOD.
APTIC-26006 02

TANAKA, E.
REGENERATION METHOD OF GAS DESULFURIZATION LIQUOR.
APTIC-26096 02

TANAKA, YOSHIO
OZONE ABSORPTION COEFFICIENTS IN THE VISIBLE AND ULTRAVIOLET REGIONS.
APTIC-24701 06

TANAKA, YOUKO
STUDIES ON PUBLIC NUISANCE CAUSED BY AIR POLLUTION. 2. AIR POLLUTION IN TAJIMI CITY.
APTIC-26289 04

TANIOKA, AKIKO
ON THE INVESTIGATION OF PUBLIC NUISANCE IN AJIMANO AREA, TAKEFU CITY.
APTIC-26028 04

TANI, M.
AUTOMATED DESIGN OF STEEL-FRAME SUPPORTED CHIMNEYS.
APTIC-26015 14

TANNO, KAZUO
CORROSION PRODUCTS IN VARIOUS ENVIRONMENTS.
APTIC-25727 09

TATSUTOMI, YASUO
THE EXHAUST EMISSION CONTROL SYSTEM FOR ROTARY ENGINES.
APTIC-26008 02

TAUDA, F.
PRESENT SITUATION AND OUTLOOK OF FLUORIDES AIR POLLUTION PREVENTION TECHNOLOGY--TACKLING WITH ALUMINUM SMELTING POLLUTION.
APTIC-26136 01

TAWARA, KO
PRELIMINARY SURVEY OF THE AIR POLLUTION IN TOKUSHIMA PREFECTURE, PART VII.
APTIC-26036 04

TAYLOR, J. K.
AIR POLLUTANT ANALYSIS.
APTIC-26106 03

TAYLOR, R. D.
SURFACE COLLECTION EFFICIENCY OF LARGE-PORE MEMBRANE FILTERS.
APTIC-22169 03

TEBBENS, BERNARD D.
HEALTH EFFECTS OF PARTICULATE AIR POLLUTION CHARACTERIZATION OF COMPACT AND FIBROUS COMPONENTS.
APTIC-25582 03

AIR SAMPLING AND ANALYSIS OF LEAD ON PAPER.
APTIC-25949 03

TEICHNER, WARREN H.
PREDICTING HUMAN PERFORMANCE IN SPACE ENVIRONMENTS.
APTIC-12612 07

TEIPEL, I.
THE EQUILIBRIUM FLOW OF A GAS-PARTICLE SYSTEM.
APTIC-24860 06

TELLO, Z.
AIR POLLUTION ALONG THE MEXICAN-AMERICAN FRONTIER.
APTIC-26299 01

TEMKIN, SAMUEL
SOUND PROPAGATION IN AN AEROSOL.
APTIC-24806 05

TERABE, MOTOJI
AIR POLLUTION IN THE UNITED STATES.
APTIC-26090 12

TERABE, M.
ON MEASURING DUST SUSPENDED IN THE ATMOSPHERE - MAINLY ON THE RECENT AND MOST FREQUENTLY USED INSTRUMENTS.
APTIC-26047 03

TER, HAAR
AIR AS A SOURCE OF LEAD IN EDIBLE CROPS.
APTIC-24947 08

TER, LINDEN
AIR POLLUTION IN HOLLAND.
APTIC-24915 02

THARALDSEN, F.
PROCEDURE FOR THE MANUFACTURE OF SULFUR FROM SULFUR DIOXIDE OR FROM GAS MIXTURES CONTAINING SULFUR DIOXIDE.
APTIC-26178 02

THAU, A.
DESULFURIZATION OF LARGE QUANTITIES OF GAS.
APTIC-26242 02

THAYER, SCOTT D.
RISE AND GROWTH OF SPACE VEHICLE ENGINE EXHAUST AND ASSOCIATED DIFFUSION MODELS.
APTIC-25685 05

THEILMANN, PIERRE
OIL-FIRED AND COAL-FIRED 600-MW BOILER OF THE POWER PLANT AT LE HAVRE.
APTIC-25677 02

THOMAS JR, CHARLES C.
ACTIVATION ANALYSIS OF AIRBORNE SELENIUM AS A POSSIBLE INDICATOR OF ATMOSPHERIC SULFUR POLLUTANTS.
APTIC-26069 03

THOMAS, FRED W.
TVA AIR POLLUTION STUDIES PROGRAM.
APTIC-25815 05

THOMAS, MOYER D.
SULFUR DIOXIDE, SULFURIC ACID AEROSOL AND VISIBILITY IN LOS ANGELES.

APTIC-26216 04

THOMAS, M. D.
WIND DIRECTION, VELOCITY AND TURBULENCE INSTRUMENTATION FOR AIR POLLUTION DIAGNOSIS.
APTIC-24862 03

THE MICRODETERMINATION OF FLUORIDE IN VEGETATION.
APTIC-24966 03

THOMPSON, N.
FLUORESCENT PARTICLES AND THEIR USE IN STUDYING AIR MOTION.
APTIC-26190 05

THOMPSON, RICHARD J.
FLUORIDE CONCENTRATIONS IN THE AMBIENT AIR.
APTIC-24736 04

THOMPSON, SANDRA
INHIBITION OF CARCINOGENESIS.
APTIC-25845 07

THORNE, LINDA
A PARTIAL POLLUTION SOLUTION   PLANT TREES.
APTIC-24622 02

THURN, WILHELM
METHOD FOR THE PREPARATION OF A CATALYST FOR THE CONVERSION OF H2S AND/OR SO2 TO ELEMENTARY SULFUR.
APTIC-24936 02

THURLBECK, W. M.
A COOPERATIVE STUDY OF CERTAIN MEASUREMENTS OF EMPHYSEMA.
APTIC-24804 07

THURSTON, R. V.
FERRIC SULPHATE AND SULPHURIC ACID FROM SULPHUR DIOXIDE AND AIR.
APTIC-26142 02

TILGNER, DAMAZY J.
FOOD IN A CARCINOGENIC ENVIRONMENT.
APTIC-25704 07

TIMAR, M.
THE EFFECT OF HEAT TREATMENT ON THE STRUCTURE OF KAOLIN AND ITS IN VITRO HEMOLYTIC ACTIVITY.
APTIC-25891 07

TOKIWA, YOSHIRO
PERFORMANCE OF A CONTINUOUS COLORIMETRIC AIR MONITOR.
APTIC-24728 03

TOMKINSON, MARGARET G.
CATALYTIC HYDROGENATION OF SULFUR DIOXIDE.
APTIC-25789 02

TONNELIER, CLAUDE
DEVICE FOR SAMPLING AEROSOLS.
APTIC-25699 03

TORII, ICHIRO
STUDIES ON AIR POLLUTION OF NEW DEVELOPING INDUSTRIAL CITY MIZUSHIMA, OKAYAMA PREFECTURE.
APTIC-26043 04

ON AIR POLLUTION OF MITSUISHI-TOWN, BIZEN-TOWN AND TAMANO-CITY, OKAYAMA PREFECTURE.
APTIC-26288 04

ON AIR POLLUTION OF OKAYAMA-CITY, OKAYAMA PREFECTURE. (II).
APTIC-26302 04

TORRENCE, SAMUEL LEE
REACTIONS OF METAL NITRATES IN MOLTEN SULFUR.
APTIC-22814 01

TOTH, J.
THE PROBLEM OF CEMENT FACTORY DUST FROM THE AGRICULTURAL STANDPOINT.
APTIC-25964 08

TOYAMA, TOSHIO
PREVALENCE OF RESPIRATORY SYMPTOMS AND PEAK FLOW RATE OF THREE YEAR OLD CHILDREN.
APTIC-26089 07

TOYAMA, T.
THE CASCADE CENTRIPETER FOR THE PARTICLE SIZE DETERMINATION AND ITS APPLICATION TO THE CHEMICAL ANALYSIS BY THE RING OVEN.
APTIC-26292 03

TRAYSER, DAVID A.
AIR POLLUTION FROM MOTOR VEHICLES.
APTIC-25886 02

TRESHOW, MICHAEL
DIFFERENTIAL RESPONSES TO AIR POLLUTION AS AN ENVIRONMENTAL HEALTH PROBLEM.
APTIC-26303 13

TREZEK, G. J.
GAS DYNAMICS OF ACCELERATING PARTICULATE FLOW IN CIRCULAR DUCTS.
APTIC-24726 06

TRINQUET, G.
TRANSFER VALUES OF CARBON MONOXIDE IN NORMAL HUMANS IN A STABLE VENTILATION STATE AT REST.
APTIC-24931 06

TROLLUX, J.
FIRST NATURAL GAS LIQUEFACTION PLANT.
APTIC-25748 02

TRUITT, J.
AEROSOL STUDIES IN THE REACTOR SAFETY PROGRAM AT OAK RIDGE NATIONAL LABORATORY.
APTIC-24875 01

TRUSS, HEINZ-WALTER
EMISSION OF HYDROGEN CHLORIDE DURING REFUSE INCINERATION.
APTIC-25862 01

TSUCHIDA, HIROTOSHI
METHOD TO REMOVE SULFUR DIOXIDE FROM ATMOSPHERIC AIR OR WASTE GAS.
APTIC-24812 02

TSUCHIDA, KAZUO
RECENT RICKETS IN INFANTS OF TOKYO METROPOLIS.
APTIC-26034 07

TSUCHIYA, KENZABURO
HORIZONTAL AND VERTICAL DISTRIBUTION OF LEAD PARTICULATES IN AIR AROUND A DUSTY ROAD IN YOKOHAMA CITY.
APTIC-25881 04

TSUGANE, TOYOTSUNE
STUDIES ON MASS EXAMINATION BY INTRADERMAL REACTION AGAINST HOUSE DUST EXTRACT AMONG SCHOOL CHILDREN IN THE AIR POLLUTED AND UNPOLLUTED AREA. REPORT II. RELATIONS BETWEEN THE INTRADERMAL REACTION AND INFLUENCES OF AIR POLLUTION ON THE HUMAN BODY.
APTIC-26004 07

TSUJI, SABURO
METHOD OF ELIMINATING SULFUR DIOXIDE AND HYDROGEN SULFIDE FROM EXHAUST GAS.
APTIC-24846 02

TSUJI, Y.
MANUFACTURING METHOD OF ACTIVATED CHARCOAL.
APTIC-24672 02

TSUTSUI, TENSON
DE-ENTRAINMENT IN PLATE COLUMN.
APTIC-25573 02

TSVETANOV, I.
FEATURES OF A COMBINED ACTION OF SULFUROUS GAS AND CARBON MONOXIDE IN THEIR JOINT PRESENCE IN THE ATMOSPHERE.
APTIC-25790 07

TUBICH, GEORGE E.
TESTING PROCEDURES AND EQUIPMENT.
APTIC-24960 03

TUDDENHAM, WILLIAM J.
ADAPTATION TO OZONE.
APTIC-25986 07

TUESDAY, CHARLES S.
HYDROCARBON REACTIVITIES IN THE ATMOSPHERIC PHOTOOXIDATION OF NITRIC OXIDE.
APTIC-24660 05

INHIBITION OF ATMOSPHERIC PHOTOOXIDATION OF HYDROCARBONS BY NITRIC OXIDE.
APTIC-24946 05

TUMA, JIRI
STANDARD METHODS OF FILTER TESTING.
APTIC-25674 02

TURK, AMOS
AIR POLLUTANT REMOVAL APPARATUS HAVING HORIZONTAL BED FOR AIR-LIQUID CONTACT.
APTIC-25885 02

TYE, RUSSELL
EXPERIMENTAL CARCINOGENESIS OF THE LUNG. II. INFLUENCE OF PHENOLS IN THE PRODUCTION OF CARCINOMA.
APTIC-24633 07

TYLER, GERMUND
REGIONAL DIFFERENCES IN THE DEPOSITION OF HEAVY METALS OVER SCANDINAVIA.
APTIC-23971 04

TYURIN, N. A.
GAS SCRUBBING IN THE HYDRODYNAMIC DUST SEPARATOR DURING ELECTROLYSIS OF ALUMINUM.
APTIC-26279 02

UCHIDA, N.
MANUFACTURING METHOD OF ACTIVATED CHARCOAL.
APTIC-24672 02

UDAGAWA, MITURU
SOME EXAMPLES OF WIDE-AREA AIR POLLUTION IN LATE SPRING.
APTIC-24685 04

UEDA, JUNICHI
A TENTATIVE PLAN CONCERNING A COMPREHENSIVE ASSESSMENT OF ENVIRONMENTAL POLLUTION.
APTIC-26304 04

UEDA, K.
TRIAL MODEL OF DUST ELIMINATION DEVICE FOR IRON FOUNDRY CUPOLA.

APTIC-26108 02

URBOGE, H.
GASIFICATION PROCESS USING ASPHALT AS RAW MATERIAL.
APTIC-26011 02

UENO, TOSHIHIRO
ADSORPTION DESULFURIZATION METHOD FOR GASEOUS SUBSTANCES CONTAINING HYDROGEN SULFIDE.
APTIC-24810 02

UNGAR, E. W.
A TRACER TECHNIQUE TO MEASURE DEPOSITION OF STACK EMISSIONS.
APTIC-26139 03

UNO, TSUKUMO
A NEW DRY PROCESS OF SO2 REMOVAL FROM FLUE GAS.
APTIC-24509 02

URY, HANS K.
POSSIBLE ASSOCIATION OF MOTOR VEHICLE ACCIDENTS WITH POLLUTANT LEVELS IN LOS ANGELES.
APTIC-26247 07

USUI, TADASHI
STUDIES ON PUBLIC NUISANCE CAUSED BY AIR POLLUTION. 2. AIR POLLUTION IN TAJIMI CITY.
APTIC-26289 04

UYEHARA, O. A.
THE REACTION OF ETHANE IN SPARK IGNITION ENGINE EXHAUST GAS.
APTIC-24747 01

THE DISAPPEARANCE OF ETHYLENE, PROPYLENE, N-BUTANE, AND 1-BUTANE IN SPARK-IGNITION ENGINE EXHAUST.
APTIC-24748 01

VALERIUS, M. M.
GAS CLEANING BY MECHANICAL SEPARATION.
APTIC-24816 02

VALI, WALT
DEVELOPMENT OF A LASER SYSTEM FOR ABSOLUTE ATMOSPHERIC DIFFUSION MEASUREMENT OF A GASEOUS TRACER MATERIAL. (FINAL REPORT).
APTIC-25936 03

VANAK, JAN
ROTARY MACHINES FOR EXTREME CLIMATIC CONDITIONS.
APTIC-25741 09

VAREKAMP, H.
INVESTIGATION OF THE RELATION BETWEEN THE HUMIDITY OF RESIDENCES AND CHRONIC ATTACKS OF THE BRONCHI OF MINORS.
APTIC-24772 07

VARMA, Y. B. G.
CATALYTIC HYDRODESULFURIZATION OF HEAVY FUEL OILS.
APTIC-25797 02

VASSY, ARLETTE
ATMOSPHERIC OZONE.
APTIC-24929 03

APTIC-24929 03

VASSY, A.
ATMOSPHERIC OZONE CONCENTRATION AT GROUND LEVEL, PORT AUX FRANCAIS STATION (KERGUELEN ISLANDS).
APTIC-26151 04

VAUGHAN JR, THOMAS R.
EFFECTS ON CANINE PULMONARY FUNCTION VIA INDUCED NO2 IMPAIRMENT, PARTICULATE INTERACTION, AND SUBSEQUENT SOX.
APTIC-24940 07

VEAZIE, F. MUNRO
FEASIBILITY OF FABRIC FILTER AS GAS-SOLID CONTACTOR TO CONTROL GASEOUS POLLUTANTS. (FINAL REPORT).
APTIC-25785 02

VECCHIO, DEL
AUTOMOTIVE AIR POLLUTION AND PROBLEMS RELATED TO ITS CONTROL EXPERIMENTATION WITH A HETEROGENEOUS AFTERBURNER.
APTIC-26300 01

VELIEV, YA. P.
DISTRIBUTION OF CARBON DIOXIDE AND SULFUR CONTAINING IMPURITIES IN THE GAS DISTRIBUTION STREAM.
APTIC-25547 02

VENKATESWARLU, D.
CATALYTIC HYDRODESULFURIZATION OF HEAVY FUEL OILS.
APTIC-25797 02

VERESS, S. A.
AIR POLLUTION RESEARCH.
APTIC-26218 03

VERGNANO, C.
STUDIES ON HUMAN AND EXPERIMENTAL LEAD POISONING. THE INHIBITORY MECHANISM OF RED BLOOD CELL ALA-DEHYDRATASE.
APTIC-24784 07

VEVERKA, VLADIMIR
A PROCESS FOR REMOVING SULPHUR DIOXIDE FROM WASTE GASES.
APTIC-26246 02

VIGLA, DOMINIQUE
FORMATION OF PARTICLES OF PHOTOLYTIC ORIGIN IN AIR.
APTIC-25564 05

VILENSKII, V. D.
THE USE OF RADIOACTIVE TRACERS IN QUANTITATIVE STUDIES OF MOVEMENTS OF THE ATMOSPHERE.
APTIC-25842 05

VINGIELLO, F. A.
A DOUBLE BRADSHER REACTION.
APTIC-25659 06

VISNISKY, ROBERT F.
PLUME EFFECTS OF NATURAL DRAFT HYPERBOLIC COOLING TOWERS.
APTIC-24835 05

VISSER, B. F.
SPIROGRAM AND WASH-OUT CURVE DO THESE METHODS DISCRIMINATE BETWEEN THE EFFECTS OF DUST INHALATION AND SMOKING UPON LUNG VENTILATION.
APTIC-25576 07

INFLUENCE OF DUST EXPOSURE UPON THE DISTRIBUTION OF ALVEOLAR VENTILATION.
APTIC-25627 07

VITTORIA, OTTAVIO
LEADED PARTICLES IN URBAN AREAS.
APTIC-25635 04

VIZEL, YA. M.
DEFLECTION OF A JET INJECTED INTO A STREAM.
APTIC-25942 05

VLCKOVA, J.
PROPERTIES OF ELECTROLYTE FILMS IN ATMOSPHERIC CORROSION.
APTIC-24655 09

VOGES, CHRISTOPH H.
EXHAUST EMISSION CONTROL BY FUEL INJECTION THE VW 1600 WITH ELECTRONICALLY CONTROLLED FUEL INJECTION SYSTEM.
APTIC-26147 02

VOLKOVA, YE. I.
DEVELOPMENT AND TESTING, WITH STANDARDIZED MIXTURES AND ON A VAPOR GENERATOR, OF AN INSTRUMENT FOR MEASURING SO3 IN COMBUSTION PRODUCTS.
APTIC-24879 03

VOLOSHCHUK, V. M.
AN ASYMPTOTIC METHOD FOR SOLVING EQUATIONS OF BROWNIAN MOTION OF AEROSOL PARTICLES.
APTIC-25807 06

VORONKOV, P. P.
HYDROCHEMICAL STUDY OF ATMOSPHERIC PRECIPITATION.
APTIC-25812 05

VOSHALL, R. E.
TABLES OF DRIFT VELOCITIES OF SLOW ELECTRONS IN HELIUM, NEON, ARGON, KRYPTON, XENON, HYDROGEN, DEUTERIUM, NITROGEN, CARBON MONOXIDE, CARBON DIOXIDE, WATER VAPOR, NITROUS OXIDE, AND AMMONIA.
APTIC-22681 06

WABRA, E.
DETERMINATION OF ARSENIC IN THE ATMOSPHERE.
APTIC-25861 03

WACHTER, ARTHUR H.
A COMPARISON OF THE EFFECT ON RAYON FABRICS OF VARIOUS GASES UNDER CONTROLLED CONDITIONS.
APTIC-25772 09

WACLAWIK, JERZY
GALVANIC APPARATUS FOR THE STUDY OF GASES. II. CONTINUOUS DETERMINATION OF SMALL AMOUNTS OF CHLORINE IN GASES.
APTIC-24863 03

WAGNER, EDDIE D.
WATER INJECTOR FOR ENGINE EXHAUST.
APTIC-25557 02

WAGNER, HANS-MICHAEL
ABSORPTION OF NO AND NO2 IN SMALL AND LARGE CONCENTRATIONS THROUGH INHALATION.
APTIC-24820 07

WAHEED, M. A.
THE EFFECT OF AIR POLLUTANTS ON THE EYE I. THE EFFECT OF AN ORGANIC EXTRACT ON THE CONJUNCTIVAL GOBLET CELLS.
APTIC-25703 07

WAINWRIGHT, H. W.
NEW POTENTIAL ABSORBENTS FOR SULFUR OXIDES REMOVAL FROM FLUE GAS.
APTIC-24932 02

WAKABAYASHI, KATSUHIKO
CHEMICAL STRUCTURES AND ACTIVITIES OF THE HYDRODESULFURIZATION CATALYSTS.
APTIC-26010 02

WAKANO, NORIAKI
TRICKLING PACKED BED REACTORS.
APTIC-26065 02

WALBERG, CLIFFORD B.
CARBON MONOXIDE LEVELS IN ACUTE MYOCARDIAL INFARCTION.
APTIC-25578 07

WALKENHORST, WILHELM
RESULTS OBTAINED WITH A NEW METHOD OF DETERMINATION OF THE

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED DUST.
APTIC-25872 03

WALKER, G.
LNG PIPELINES - A STATUS SURVEY.
APTIC-25697 02

WALKER, SCOTT W.
HYDROGEN SULFIDE FROM SULFUR DIOXIDE AND METHANE.
APTIC-24739 06

WALLER, R. E.
THE ROLE OF 3 4-BENZPYRENE IN THE EPIDEMIOLOGY OF LUNG CANCER.
APTIC-25613 07

WALTERS, M.
STUDIES OF THE MODE OF ACTION OF ASBESTOS AS A CARCINOGEN.
APTIC-24925 07

WARSHAW, MICHAEL
A MODEL OF GLOBAL CLIMATE AND ECOLOGY.
APTIC-25967 05

WASZAK, STEFAN
GALVANIC APPARATUS FOR THE STUDY OF GASES. II. CONTINUOUS DETERMINATION OF SMALL AMOUNTS OF CHLORINE IN GASES.
APTIC-24863 03

WATANABE, HIRONOBU
RADIATION SAFETY OF POWER REACTORS. PART I. ENVIRONMENTAL CONTAMINATION AND ITS EFFECTS TO THE PUBLIC.
APTIC-25914 01

WATANABE, HIROSHI
FINDINGS OF PFR ON SO_2 HIGH SENSITIVE SCHOOL CHILDREN.
APTIC-25740 07

EFFECTS ON RAT OF CHRONIC EXPOSURE OF LOW CONCENTRATION OF CO. PART I.
APTIC-26113 07

WATANABE, H.
CONTINUOUS MEASUREMENT OF LOW GRADE HYDROCARBONS IN URBAN ATMOSPHERE.
APTIC-26109 03

WATANABE, KAZUE
RECENT RICKETS IN INFANTS OF TOKYO METROPOLIS.
APTIC-26034 07

WATKINSON, E. A.
ASSOCIATED HEALTH IMPLICATIONS IN AIR-POLLUTION CONTROL.
APTIC-24910 07

WATKINS, E. R.
ELECTROSTATIC PRECIPITATION FOR LARGE BOILERS.
APTIC-25033 02

WATNFORTH, H. D.
INTRATRACHEAL ADMINISTRATION OF DUST PARTICLES AND CARCINOGENS IN RATS.
APTIC-26099 07

WEBER, DARRELL J.
PRELIMINARY INVESTIGATIONS ON THE BIOSYNTHESIS OF METHYL ESTERS OF FATTY ACIDS IN RHIZOPUS ARRHIZUS FISCHER.
APTIC-12755 06

WEBER, D. J.
DISTRIBUTION OF FUNGAL SPORE TYPES IN SELECTED AREAS IN TEXAS.
APTIC-12613 01

INCORPORATION OF ACETATE-1-C14 INTO ALKANES, FATTY ACIDS, METHYL ESTERS AND FREE FATTY ACIDS OF SPORES AND MYCELIUM OF RHIZOPUS ARRHIZUS.
APTIC-12614 06

LIPID COMPONENTS OF SCLEROTIA OF SCLEROTINIA SCLEROTIORUM.
APTIC-12615 06

FATTY ACID ANALYSIS OF CEREBROSPINAL FLUID OF CHICKEN.
APTIC-12616 06

WEBER, HERBERT J.
VENTILATION AT NON-FERROUS MELTING AND POURING OPERATIONS.
APTIC-24607 02

WEEDY, B. C.
HOW AIR POLLUTION CAN BE CONTROLLED IN A PLANT.
APTIC-25939 02

WEEKES, MARTIN E.
CONTROL OF AUTOMOBILE EMISSIONS- CALIFORNIA EXPERIENCE AND THE FEDERAL LEGISLATION.
APTIC-25591 12

WEETE, JOHN
LIPID COMPONENTS OF SCLEROTIA OF SCLEROTINIA SCLEROTIORUM.
APTIC-12615 06

WEETE, JOHN D.
PRELIMINARY INVESTIGATIONS ON THE BIOSYNTHESIS OF METHYL ESTERS OF FATTY ACIDS IN RHIZOPUS ARRHIZUS FISCHER.
APTIC-12755 06

WEETE, J. D.
DISTRIBUTION OF FUNGAL SPORE TYPES IN SELECTED AREAS IN TEXAS.
APTIC-12613 01

INCORPORATION OF ACETATE-1-C14 INTO ALKANES, FATTY ACIDS, METHYL ESTERS AND FREE FATTY ACIDS OF SPORES AND MYCELIUM OF RHIZOPUS ARRHIZUS.
APTIC-12614 06

FATTY ACID ANALYSIS OF CEREBROSPINAL FLUID OF CHICKEN.
APTIC-12616 06

WEFRING, K.
PNEUMONIA IN THE AREA OF THE SAUDA FACTORIES OF RYFLYKE.
APTIC-24586 07

WEIL, CARROL S.
RELATIONSHIP OF RESULTS OF LONG-TERM TOXICITY STUDIES TO THOSE OF SHORTER DURATION.
APTIC-24963 03

WEIL, C. S.
THE TOXICOLOGICAL BASIS OF THRESHOLD LIMIT VALUES 5. THE EXPERIMENTAL INHALATION OF VAPOR MIXTURES BY RATS, WITH NOTES UPON THE RELATIONSHIP BETWEEN SINGLE DOSE INHALATION AND SINGLE DOSE ORAL DATA.
APTIC-26270 07

WEINER, ERVIN C.
METHOD AND APPARATUS FOR RECYCLING DRYER STACK GASES.
APTIC-25863 02

WEINSTEIN, LEONARD H.
IMPLICATIONS OF AIR POLLUTION FOR PLANT LIFE.
APTIC-26219 08

WEIN, H.
CONSTRUCTION OF POWER PLANT STACKS IN THE LIGHT OF PRACTICAL EXPERIENCE.
APTIC-22794 14

WELLINGS, S. R.
RESPIRATORY DAMAGE DUE TO ATMOSPHERIC POLLUTANTS IN THE ENGLISH SPARROW, PASSER DOMESTICUS.
APTIC-25577 08

WELLS, WILLIAM C.
MEASUREMENT OF THE LIFETIME OF THE A 1 PI STATE OF CO BY LEVEL-CROSSING SPECTROSCOPY.
APTIC-24888 06

WENDER, IRVING
CONVERSION OF URBAN REFUSE TO OIL.
APTIC-25753 02

WERNER, A. E.
SULPHUR COMPOUNDS IN KRAFT PULP MILL EFFLUENTS.
APTIC-24902 01

WEST, JAMES R.
THE THERMODYNAMIC PROPERTIES OF SULFUR DIOXIDE.
APTIC-25954 06

WETZEL, BERTHA
APPARATUS FOR CONTROL OF AIR POLLUTION.
APTIC-25910 02

WHEELOCK, T. D.
SINGLE DETECTOR AND FORECOLUMN TRAP FOR SERIES GAS-CHROMATOGRAPHY ANALYSIS.
APTIC-24699 03

WHITBY, K. T.
CENTRIFUGE SEDIMENTATION SIZE ANALYSIS OF SAMPLES OF AIRBORNE DUSTS COLLECTED IN MEMBRANE FILTERS.
APTIC-25843 03

WHITESIDES, GEORGE M.
THE REACTION OF ORGANIC ANIONS WITH CARBON MONOXIDE. (FINAL REPORT).
APTIC-25852 06

WHITTAKER, E. L.
AEROSOL PREPARATION, GENERATION, AND ASSESSMENT. PROJECT HARE.
APTIC-25760 03

WIEDERSUM JR, G. C.
CONTROL OF POWER PLANT EMISSIONS.
APTIC-24837 02

WIEGEL, JOHN W.
GAS FILTER BAG STRUCTURE.
APTIC-25909 02

WIETHAUP, H.
THE SHARE OF AUTOMOBILE EXHAUST GASES IN AIR POLLUTION.
APTIC-24783 01

WIGGINS, T. A.
CHANGES IN ROTATIONAL CONSTANTS IN SOME PI-SIGMA BANDS OF HCN AND N_2O.
APTIC-25673 06

WILEY, FORREST P.
RECOVERY OF SO_2.
APTIC-25560 02

WILLIAMS JR, PHILIP
AIR POLLUTION POTENTIAL OVER THE SALT LAKE VALLEY OF UTAH AS RELATED TO STABILITY AND WIND SPEED.
APTIC-26264 05

WILLIAMS, CHARLES R.

AIR POLLUTION FROM FLUORIDES.
APTIC-26258 01

WILLIAMS, HOWARD PERSON
RADIO FREQUENCY GAS CHROMATOGRAPHIC DETECTORS.
APTIC-24765 03

WILSON, COLIN
IMPROVEMENTS IN OR RELATING TO DUST TRAPS FOR USE IN THE EXAMINATION OF DUST-LADEN GAS.
APTIC-25664 03

WILSON, H. I.
AUTOMOTIVE STARTING AND WARM-UP RESPOND TO GASOLINE VOLATILITY.
APTIC-25931 01

WINSCHE, W. E.
METAL HYDRIDES AS A SOURCE OF FUEL FOR VEHICULAR PROPULSION.
APTIC-24746 02

WISWALL, R. H.
METAL HYDRIDES AS A SOURCE OF FUEL FOR VEHICULAR PROPULSION.
APTIC-24746 02

WITHROW, LLOYD
EFFECT OF TETRAETHYLLEAD ON PREFLAME REACTIONS IN AN ENGINE.
APTIC-24718 01

WITKOWSKA, LUCYNA
EXTENSIVE PULMONARY CHANGES IN AN APPARENTLY LIGHT NITROGEN OXIDES POISONING.
APTIC-25747 07

WOBBER, FRANK J.
ORBITAL PHOTOS APPLIED TO THE ENVIRONMENT.
APTIC-26187 03

WODTCKE, FRIEDRICH
CATALYTIC REACTION OF CARBON MONOXIDE WITH STEAM.
APTIC-25700 02

WOHLERS, H. C.
LITERATURE REVIEW OF METROPOLITAN AIR POLLUTANT CONCENTRATIONS--PREPARATION, SAMPLING AND ASSAY OF SYNTHETIC ATMOSPHERES. (FINAL REPORT).
APTIC-22812 03

CORROSION ASPECTS OF AIR POLLUTION IN THE SAN FRANCISCO BAY AREA--RUBBER PRODUCTS.
APTIC-25585 09

WOHLWILL, MAX
PROCESS FOR OBTAINING ELEMENTAL SULFUR FROM SULFUR DIOXIDE OR GASES CONTAINING IT.
APTIC-25385 02

WOITOWITZ, HANS-JOACHIM
ASSESSING THE DEGREE OF EXPOSURE TO DUST AND OCCUPATIONAL EPIDEMIOLOGY.
APTIC-25543 07

WOITOWITZ, ROTRAUD
ASSESSING THE DEGREE OF EXPOSURE TO DUST AND OCCUPATIONAL EPIDEMIOLOGY.
APTIC-25543 07

WOJCIECHOWSKI, KAZIMIERZ
THE DEPOSITION OF DUST PARTICLES FROM ELEVATED SOURCES.
APTIC-25648 05

WOLKENBERG, GERHARD
SPECIAL FEATURES OF THE 140 MW TURBINE OF THE DUISBURG POWER PLANT.
APTIC-26237 01

WOODWARD, KENNETH R.
CHATTANOOGA, TENNESSEE -- ROSSVILLE, GEORGIA INTERSTATE AIR QUALITY STUDY 1967-1968.
APTIC-26086 04

WRBA, H.
THE CURRENT STATUS OF CANCER RESEARCH.
APTIC-24971 07

WRIGHT, R. H.
IS IT POSSIBLE TO BUILD AND OPERATE A COMPLETELY ODORLESS KRAFT MILL
APTIC-24903 02

WULF, OLIVER R.
THE THEORETICAL CALCULATION OF THE DISTRIBUTION OF PHOTOCHEMICALLY-FORMED OZONE IN THE ATMOSPHERE.
APTIC-25924 05

WURZBACHER, GERHARD
A SCATTERED LIGHT PARTICLE-SIZE SPECTROMETER FOR SUBMICROSCOPIC AEROSOLS OF HIGH CONCENTRATION.
APTIC-25871 03

XINTARAS, C.
THE PUBLIC HEALTH SIGNIFICANCE OF ATMOSPHERIC LEAD.
APTIC-25991 07

YAFFE, CHARLES D.
PROGRESS IN STATE AND LOCAL AIR POLLUTION CONTROL UNDER THE CLEAN AIR ACT.
APTIC-12495 12

YAGI, A.
REGENERATION METHOD OF GAS DESULFURIZATION LIQUOR.
APTIC-26046 02

YAMADA, HIROSHI
A NEW DRY PROCESS OF SO2 REMOVAL FROM FLUE GAS.
APTIC-24589 02

YAMADA, K.
METHOD OF ELIMINATING SULFUR COMPOUNDS FROM OIL WITH THE USE OF MICROBES.
APTIC-24641 02

APTIC-24641 02

MICROBIAL REMOVAL OF SULFIDE CONTAINED IN PETROLEUM.
APTIC-25101 02

YAMADA, TAKESHI
RESEARCH AND DEVELOPMENT OF AIR POLLUTION CONTROL TECHNOLOGY IN THE UNITED STATES. PART II.
APTIC-25895 02

YAMAGISHI, KAZUO
DEVELOPMENT OF HIGH SPEED BURNER.
APTIC-24824 02

YAMAGUCHI, SEIYA
EFFECT OF AIR POLLUTION ON THE INHABITANTS IN OMUTA WITH SPECIAL REFERENCE TO THE FINDINGS OF LUNG FUNCTION AND CHEST X-RAY FILM.
APTIC-26024 07

YAMAMOTO, S.
TREATMENT OF DUST GENERATED AT IRON MILL.
APTIC-26003 02

YAMANAKA, AKIHIRO
EXPERIMENTS ON ANISOKINETIC SAMPLING ERRORS FOR SOLID-LIQUID TWO-PHASE FLOW.
APTIC-25574 03

YAMAOKA, SHIGEO
FINDINGS OF PFR ON SO2 HIGH SENSITIVE SCHOOL CHILDREN.
APTIC-25740 07

EFFECTS ON RAT OF CHRONC EXPOSURE OF LOW CONCENTRATION OF CO. PART I.
APTIC-26113 07

YAMASHIRO, YUICHIRO
STUDIES ON THE RELATIONSHIP BETWEEN AIR POLLUTION AND INFANTILE ASTHMA ATTACKS. USING THE SO2 CONCENTRATION IN THE AIR AS AN INDICATOR.
APTIC-26051 07

YAMASHITA, E.
LOW VOLUME AIR SAMPLER RESEARCH ON THE MEASUREMENT OF THE PARTICULATES IN THE AIR WITH LOW VOLUME AIR SAMPLER.
APTIC-26007 03

YAMASHITA, SHUJI
AN URBAN-CLIMATOLOGICAL STUDY OF THE ATTENUATION OF SOLAR RADIATION BY AIR POLLUTION IN TOKYO.
APTIC-26059 05

YAMATE, NOBORU
MEASUREMENT OF GASEOUS AIR POLLUTION.
APTIC-26122 03

YAMATE, N.
MEASURING METHOD OF AIR POLLUTANTS DUE TO AUTOMOBILE EXHAUST.
APTIC-24644 03

YAMAZAKI, V.
THE DETERMINATION OF HEAVY METALS IN DUSTFALL BY ATOMIC-ABSORPTION-SPECTROPHOTOMETRY.
APTIC-25535 03

YANAGIHARA, SHIGERU
EMISSION AND PERFORMANCE OF GASOLINE ENGINE.
APTIC-24813 01

YANAGIHARA, S.
MEASUREMENT OF AUTOMOBILE EXHAUST GAS.
APTIC-24638 03

YARRINGTON, ROBERT MURPHY
IMPROVED PROCEDURE FOR PURIFYING THE EXHAUST OF INTERNAL COMBUSTION MOTORS.
APTIC-26243 02

YASUDA, STANLEY K.
CELLULOSE SUPPORTED THORIUM-ALIZARIN RED S REAGENT FOR FLUORIDE ION DETERMINATION.
APTIC-26259 03

YASUI, N.
LIGHT OIL AS DIESEL ENGINE FUEL AND ITS PROBLEMS.
APTIC-26048 01

YATSUMAKI, M.
SYMPOSIUM RECENT PROBLEMS ON AUTOMOTIVE FUELS.
APTIC-26134 02

YEFREMOV, YU. G.
EVALUATION OF THE PROCESS OF OBTAINING AROMATIC HYDROCARBONS FROM COKE-OVEN GAS.
APTIC-24620 02

YELENKOV, D.
EFFECT OF SURFACE-ACTIVE AGENTS ON THE RATE OF ABSORPTION.

APTIC-24790 06

YOKAICHI, ISHIKAI
STUDIES ON RESPIRATORY TRACT DISEASES CAUSED BY AIR POLLUTION --SURVEY OF PUBLIC NUISANCES GRANT BY THE HEALTH AND WELFARE MINISTRY, IN 1967.
APTIC-26053 07

YOKOYAMA, EIJI
EFFECT OF IN VITRO EXPOSURE TO O3 ON SURFACE TENSION OF LUNG EXTRACT.
APTIC-26115 07

YORK, OTTO H.
TWO-STAGE MIST ELIMINATORS FOR SULFURIC ACID PLANTS.
APTIC-24833 02

YOSHIDA, A.
MANUFACTURING METHOD OF ACTIVATED CHARCOAL.
APTIC-24672 02

YOSHIDA, KATSUMI
ZINC ACETATE CYLINDER METHOD (INTEGRAL) FOR HYDROGEN SULFIDE IN THE AIR AS AIR POLLUTANT.
APTIC-25572 03

SOME OBSERVATIONS ON ANIMALS EXPOSED TO AIR POLLUTANTS ESPECIALLY SULPHUR OXIDES.
APTIC-26116 07

PRESENT STATE OF AIR POLLUTION IN YOKKAICHI AND VARIOUS MEDICAL PROBLEMS ABOUT IT.
APTIC-26305 07

YOSHIDA, MASAAKI
STUDIES IN THE PSYCHOLOGY OF OLFACTION (3). QUALITATIVE CLASSIFICATION OF ODOURS.
APTIC-26309 03

YOSHIDA, ZENGI
STUDIES ON THE RELATIONSHIP BETWEEN AIR POLLUTION AND INFANTILE ASTHMA ATTACKS. USING THE SO2 CONCENTRATION IN THE AIR AS AN INDICATOR.
APTIC-26051 07

YOSHIOKA, HARUO
ON UOP RCD ISOMAX METHOD.
APTIC-26133 02

YOSHIO, JIRO
AN EXPERIMENT STUDY ON EXHAUST GASES OF KEROSENE WITH VEHICLE ENGINE.
APTIC-25754 01

YOUNG, MARGARET A.
THE EFFECT OF AIR POLLUTANTS ON COTTON.
APTIC-24899 09

YOUNG, MARION M.
NITROGEN DIOXIDE AND LOWER RESPIRATORY ILLNESS.
APTIC-25966 07

YO, YOSHINOBU
ABSORPTION OF SO2 GAS BY VARIOUS SOLVENTS.
APTIC-24735 02

YUMLU, V. S.
EXHAUST EMISSION CHARACTERISTICS OF FOUR-STROKE, DIRECT INJECTION, COMPRESSION IGNITION ENGINES.
APTIC-25922 01

YUU, SHINICHI
SEPARATION MECHANISM OF ROUND NOZZLE CASCADE IMPACTOR EFFECT OF CLEARANCE RATIO.
APTIC-25719 03

ZABEL, HERMAN W.
NEW PENNSALT HF PLANT.
APTIC-26244 02

ZAFONTE, LEO
RATE CONSTANTS FOR ATMOSPHERIC REACTIONS.
APTIC-26234 05

ZAGHEN, JIRI
DETERMINATION OF POLLUTANTS IN INDUSTRY WITH THE USE OF MINE INTERFEROMETER.
APTIC-24938 03

ZAHN, CHARLES
TEMPERATURE AS A FACTOR IN DETERMINING ORDER OF ELUTION IN GAS-LIQUID CHROMATOGRAPHY OF SOME C5-C8 HYDROCARBONS.
APTIC-24587 03

ZAHN, RICHARD
THE EFFECT OF PLANTS OF A COMBINATION OF SUBACUTE AND TOXIC SULFUR DIOXIDE DOSES.
APTIC-25662 08

ZAITLIN, MILTON
INVESTIGATION ON INJURY TO PLANTS FROM AIR POLLUTION IN THE LOS ANGELES AREA.
APTIC-26146 08

ZALKIND, D. I.
ATMOSPHERIC CORROSION OF TALLIUM.
APTIC-24619 09

ZALMAN, SOLOMON
ANTIPOLLUTION APPARATUS.
APTIC-25706 02

ZENIN, H. T.
REGARDING THE EFFECT OF PHYSICOGEORGRAPHIC CONDITIONS ON THE CONCENTRATION OF INDUSTRIAL EMISSIONS INTO THE ATMOSPHERE.
APTIC-25013 05

ZERBIB, JEAN CLAUDE
DEVICE FOR SAMPLING AEROSOLS.
APTIC-25699 03

ZHERDEVA, YE. A.
DETERMINING THE COMPOSITION OF RAW BENZENE BY GAS-LIQUID CHROMATOGRAPHY.
APTIC-24621 03

ZHIKHAREVA, V. I.
COMPLEXOMETRIC DETERMINATION OF SULFUR TRIOXIDE AND SULFUR DIOXIDE IN WASTE PROCESS GASES.
APTIC-26067 03

ZHOROV, N. A.
METHODS OF SAMPLING SUSPENDED DUST FOR MEASURING THE FREE SILICA CONTENT.
APTIC-26076 03

ZIMMERMANN, H. J.
SENSING OF METEOROLOGICAL VARIABLES BY LASER PROBE TECHNIQUES. (FINAL REPORT).
APTIC-25796 05

ZINK, JOHN SMITH
FLARE STACK BURNER ASSEMBLY.
APTIC-25558 02

ZOELLNER, ROBER
BENZO(A)PYRENE AND BENZ(A)ANTHRACENE.
APTIC-24905 06

ZORKOCZY, JULIUS
METHOD FOR THE DESULFURISATION OF GASES CONTAINING HYDROGEN SULFIDE OR SULFUR DIOXIDE AND FOR THE PREPARATION OF CRYSTALLINE SULFUR.
APTIC-26163 02

ZUNG, JOSEPH T.
EVAPORATION RATES AND LIFETIMES OF CLOUDS AND SPRAYS IN AIR. II. THE CONTINUUM MODEL.
APTIC-24890 05

ZURLO, NICOLA
MEASUREMENT OF THE SULFUR TRIOXIDE CONTENT OF THE AIR.
APTIC-25854 03

ZYKOV, D. D.
EVALUATION OF THE PROCESS OF OBTAINING AROMATIC HYDROCARBONS FROM COKE-OVEN GAS.
APTIC-24620 02

, GRELLA
AUTOMOTIVE AIR POLLUTION AND PROBLEMS RELATED TO ITS CONTROL EXPERIMENTATION WITH A HETEROGENEOUS AFTERBURNER.
APTIC-26300 01

Order Form
AIR POLLUTION ABSTRACTS
Volume 02, Number 03

APCO staff only may use this form. Others may request copies as indicated in the Introduction in this periodical.

Send to:

Air Pollution Technical Information Center
Air Pollution Control Office
Post Office Box 12055
Research Triangle Park, North Carolina 27709

Attention: Technical Inquiries Section

Microfiche duplicates are requested of the accessions whose APTIC numbers are circled. Those who do not have access to a microfiche reader may request paper copies.

12493	12494	12495	12496	12569	12595	12596	12612	12613	12614	12615	12616
12619	12751	12755	12771	12777	12792	12823	12829	12832	12833	12834	12835
12836	18289	22169	22180	22190	22195	22220	22246	22403	22444	22681	22703
22722	22731	22794	22809	22812	22814	23369	23385	23390	23503	23591	23612
23726	23762	23790	23819	23821	23866	23959	23971	24015	24039	24041	24042
24059	24121	24153	24165	24576	24577	24579	24580	24581	24582	24583	24584
24585	24586	24587	24588	24589	24590	24591	24592	24593	24594	24595	24596
24597	24598	24599	24600	24601	24602	24603	24604	24605	24606	24607	24608
24609	24610	24611	24611	24612	24613	24614	24615	24616	24617	24618	24618
24619	24620	24621	24622	24623	24624	24625	24626	24627	24627	24628	24629
24629	24630	24631	24632	24633	24634	24635	24636	24637	24638	24639	24640
24641	24641	24642	24643	24644	24645	24646	24647	24648	24649	24650	24651
24652	24653	24654	24655	24656	24658	24659	24660	24661	24662	24663	24664
24665	24667	24668	24669	24670	24671	24672	24673	24674	24675	24676	24677
24678	24679	24680	24681	24682	24683	24684	24685	24686	24688	24689	24690
24691	24692	24693	24694	24695	24696	24697	24698	24699	24700	24701	24703
24704	24705	24706	24707	24708	24709	24710	24711	24715	24716	24717	24718
24719	24720	24721	24722	24723	24724	24725	24726	24727	24728	24729	24730
24731	24732	24733	24734	24735	24736	24737	24738	24739	24740	24741	24742
24743	24744	24745	24746	24747	24748	24749	24750	24751	24752	24753	24754
24755	24756	24757	24758	24759	24760	24761	24762	24763	24764	24765	24766
24767	24768	24769	24770	24770	24771	24772	24773	24774	24775	24776	24777
24778	24779	24780	24781	24782	24782	24783	24784	24785	24786	24787	24788
24789	24790	24791	24792	24793	24794	24795	24796	24797	24798	24799	24800
24801	24802	24803	24804	24805	24806	24807	24808	24809	24810	24811	24812
24813	24814	24815	24816	24817	24818	24819	24820	24821	24822	24823	24824
24825	24826	24827	24828	24829	24830	24831	24832	24833	24834	24835	24836
24837	24838	24839	24840	24841	24842	24843	24844	24845	24846	24847	24850
24851	24852	24853	24854	24855	24856	24857	24858	24859	24860	24861	24862
24863	24864	24865	24866	24867	24868	24869	24870	24871	24872	24873	24874
24875	24876	24877	24878	24879	24880	24881	24881	24882	24883	24884	24885
24886	24887	24888	24889	24890	24891	24892	24893	24893	24894	24895	24896
24897	24899	24900	24901	24902	24903	24904	24905	24906	24907	24908	24909
24910	24913	24914	24915	24916	24917	24918	24919	24920	24921	24922	24923
24924	24925	24926	24927	24928	24929	24929	24930	24931	24932	24933	24934
24935	24936	24937	24938	24939	24940	24941	24942	24943	24944	24945	24945
24946	24947	24948	24949	24950	24951	24952	24953	24954	24955	24956	24957
24958	24959	24960	24961	24962	24963	24964	24965	24966	24967	24968	24969
24970	24971	24972	24973	24974	24975	24976	25101	25535	25536	25537	25538
25539	25540	25541	25543	25544	25545	25547	25548	25549	25550	25551	25552
25553	25554	25555	25556	25557	25558	25559	25560	25561	25562	25563	25564
25565	25566	25567	25568	25569	25570	25571	25572	25573	25574	25575	25576
25577	25578	25579	25580	25581	25582	25583	25584	25585	25586	25587	25588
25589	25590	25591	25592	25593	25594	25595	25596	25597	25598	25599	25600
25601	25602	25603	25604	25605	25606	25608	25609	25610	25611	25613	25614
25615	25616	25617	25618	25619	25621	25622	25623	25624	25625	25626	25627
25628	25629	25630	25631	25632	25633	25634	25635	25636	25637	25638	25639
25640	25641	25642	25643	25644	25645	25646	25647	25648	25649	25650	25651
25652	25653	25654	25655	25656	25657	25658	25659	25660	25661	25662	25663
25664	25665	25666	25667	25668	25669	25670	25671	25672	25673	25674	25675
25676	25677	25678	25679	25680	25681	25682	25683	25684	25685	25686	25687

Continued on next page

25688 25689 25690 25691 25692 25693 25694 25695 25696 25697 25698 25699
25700 25702 25703 25704 25705 25706 25708 25709 25710 25711 25712 25713
25714 25715 25716 25717 25718 25719 25720 25721 25722 25723 25724 25725
25726 25727 25728 25729 25730 25731 25732 25733 25734 25735 25736 25737
25738 25739 25740 25741 25742 25743 25744 25745 25746 25747 25748 25749
25750 25751 25752 25753 25754 25755 25756 25757 25758 25759 25760 25761
25762 25763 25764 25765 25766 25767 25768 25769 25770 25771 25772 25773
25774 25775 25776 25777 25778 25779 25780 25781 25782 25783 25784 25785
25786 25787 25788 25789 25790 25791 25792 25793 25794 25795 25796 25797
25798 25799 25800 25801 25802 25803 25804 25805 25806 25807 25808 25809
25810 25811 25812 25813 25814 25815 25816 25817 25818 25819 25820 25821
25822 25823 25824 25825 25826 25827 25828 25829 25830 25831 25832 25833
25834 25835 25836 25837 25838 25839 25840 25842 25843 25844 25845 25846
25847 25848 25849 25850 25851 25852 25853 25854 25855 25856 25857 25858
25859 25860 25861 25862 25863 25864 25865 25866 25867 25868 25869 25870
25871 25872 25873 25874 25875 25876 25877 25878 25879 25880 25881 25882
25883 25884 25885 25886 25887 25888 25889 25890 25891 25892 25893 25894
25895 25906 25907 25908 25909 25910 25911 25912 25913 25914 25915 25916
25917 25918 25919 25920 25921 25922 25923 25924 25925 25926 25927 25928
25929 25930 25931 25932 25933 25935 25936 25937 25938 25939 25940 25941
25942 25943 25944 25945 25946 25947 25948 25949 25951 25952 25953 25954
25955 25956 25957 25958 25959 25960 25961 25962 25963 25964 25965 25966
25967 25968 25969 25970 25971 25972 25973 25974 25975 25976 25977 25978
25979 25980 25981 25982 25983 25984 25985 25986 25987 25988 25989 25990
25991 25992 25993 25994 25995 25996 25997 25998 25999 26000 26001 26002
26003 26004 26005 26006 26007 26008 26009 26010 26011 26012 26013 26014
26015 26016 26017 26018 26019 26020 26021 26022 26023 26024 26025 26026
26027 26028 26029 26030 26031 26032 26033 26034 26035 26036 26038 26039
26040 26041 26042 26043 26044 26045 26046 26047 26048 26051 26052 26053
26054 26055 26056 26057 26058 26059 26060 26061 26062 26063 26064 26065
26066 26067 26068 26069 26070 26071 26072 26073 26074 26076 26077 26078
26080 26081 26082 26083 26085 26086 26087 26088 26089 26090 26091 26093
26094 26095 26096 26097 26098 26099 26100 26102 26103 26104 26105 26106
26107 26108 26109 26110 26111 26113 26114 26115 26116 26117 26118 26119
26120 26121 26122 26123 26124 26125 26126 26128 26129 26130 26131 26132
26133 26134 26135 26136 26137 26138 26139 26140 26141 26142 26143 26144
26145 26146 26147 26148 26149 26150 26151 26152 26154 26155 26156 26157
26158 26159 26160 26161 26162 26163 26164 26165 26166 26167 26168 26169
26170 26171 26172 26173 26174 26176 26177 26178 26179 26180 26181 26182
26183 26184 26185 26186 26187 26188 26189 26190 26191 26192 26193 26194
26195 26196 26197 26198 26199 26200 26201 26202 26203 26204 26205 26206
26207 26209 26211 26213 26214 26215 26216 26217 26218 26219 26220 26221
26222 26223 26224 26225 26226 26227 26228 26229 26230 26231 26232 26233
26234 26235 26236 26237 26238 26239 26240 26241 26242 26243 26244 26245
26246 26247 26248 26249 26250 26251 26252 26253 26254 26255 26256 26257
26258 26259 26260 26261 26262 26263 26264 26265 26266 26267 26268 26269
26270 26271 26272 26274 26275 26276 26277 26279 26280 26281 26282 26283
26284 26285 26286 26287 26288 26289 26290 26291 26292 26293 26294 26295
26296 26297 26299 26300 26301 26302 26303 26304 26305 26306 26307 26308
26309 26310 26311

DATE ____________________

NAME ____

NAPCA PROGRAM ____

ADDRESS ____

____

U.S. GOVERNMENT PRINTING OFFICE : 1971 O-LT - 416-536